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## CONTENTS

ILLUSTRATIONS:	PAGE.	GENERAL NEWS:	PAGE.
Improvements on the Baltimore & Ohio.....	793	Bridge Building.....	804
Automatic Block Signals—Cincinnati, New Orleans & Texas.....	795	Meetings and Announcements.....	804
The Effect of an Earthquake in India.....	797	Persons.....	804
A Case of Corrosion.....	797	Elections and Appointments.....	805
Horizontal Duplex Milling Machine.....	798	Railroad Construction.....	805
Columbus Union Passenger Station.....	798	Electric Railroad Construction.....	806
Double Cylinder Planing and Matching Machine.....	802	General Railroad News.....	807
		Electric Railroad News.....	808
		Traffic.....	808
CONTRIBUTORS:		MISCELLANEOUS:	
The Brakeshoe Testing Machine.....	793	Technical.....	802
		The Scrap Heap.....	803
EDITORIALS:		Test of a Compound Locomotive—Eastern Railroad of France.....	793
The Coming of the Steel Car.....	800	Discipline on the Soo.....	795
Annual Reports—Southern Pacific, Great Northern.....	801	Multiphase Current Transmission for Steel Railroads.....	796
EDITORIAL NOTES.....	800, 801	Automobile Vehicle.....	796
New Publications.....	802	Pioneer Railroad of Ohio—Seven Years an Assistant Brakeman.....	798
GENERAL NEWS:		The Siberian Railroad.....	798
Locomotive Building.....	804	Foreign Railroad Notes.....	799
Car Building.....	804		

### Contributions.

### The Brakehoe Testing Machine.

ST. PAUL, MINN., Oct. 30.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The excellent suggestion of moving the M. C. B. brake-shoe testing machine from Wilmerding to Purdue University, in your editorial of Oct. 8, should need no extensive endorsement. The experimental work already done in the well-equipped laboratory of Purdue in the line of the development of locomotive design is so widely and favorably known among railroad mechanical men that the proposition to enlarge the field of usefulness of Professor Goss and his able assistants in a branch of laboratory work so valuable as the development of the brakeshoe of greatest efficiency, cannot fail of the hearty approval of the members of the M. C. B. Association.

It is to be hoped that the Executive Committee of that Association will soon endeavor to make satisfactory arrangements for continuing the usefulness of the testing machine so ably handled by the Committee on Brakeshoe Tests in a way that will enable the members to follow the development of new types of shoes, by placing at their disposal data obtained from the same machine with which the Committee's tests were made. It would seem that this could not be done in any better or more satisfactory way than by placing this testing machine under proper regulations in the engineering laboratory of such a progressive educational institution as Purdue.

E. M. HERR.

### Test of a Four-Cylinder Compound Locomotive—East ern Railroad of France.

It will be remembered that the Paris, Lyons & Mediterranean Railroad has a number of four-cylinder compound locomotives in service, the use of which has had considerable influence upon the introduction of this type of locomotive in France. Among other roads the Midi (Southern) also has a number, one of which has recently been tested on the Eastern Railroad in competition with three simple engines. According to an article by M. Salomon, the engineer in charge of the locomotive department of the Eastern Railroad, appearing in the September issue of the *Revue Generale des Chemins de Fer*, the tests were thorough. From that article we make the following abstract.

The compound locomotive was loaned to the Eastern Railroad for the purpose of the competitive trial. Its principal dimensions as well as those of the simple engines are given below:

	Compound.	Simple.
Diameter of driving wheels.....	83.85 in.	82.28 in.
"    " truck.....	40.94 "	41.73 "
"    " cylinders, H. P.....	13.78 "	18.50 "
L. P.....	21.63 "	
Stroke of pistons.....	25.20 "	26.98 "
Maximum travel of valves, H. P. 4.96 "		5.51 "
L. P.....	4.96 "	
Inside lap, H. P.....	.12 "	.04 "
"    " L. P.....	.12 "	
Outside " H. P.....	1.06 "	1.30 "
"    " L. P.....	1.6 "	
Minimum point of cut-off, per cent.....	10	10
Maximum.....	75	77
Admission ports, H. P. 1.33 in. × 10.63 in.		1.77 in. × 14.57 in.
"    " L. P. 1.57 in. × 16.54 in.		
Exhaust " H. P. 2.76 in. × 10.63 in.		3.39 in. × 14.57 in.
"    " L. P. 3.15 in. × 16.54 in.		
Weight of engine, empty.....	107,693 lbs.	112,061 lbs.
"    " loaded.....	117,336 "	124,885 "
" on drivers.....	71,874 "	73,471 "
" truck.....	45,452 "	51,614 "
" front drivers.....	37,004 "	36,623 "
" rear.....	34,570 "	36,543 "
" of tender empty.....	34,251 "	33,451 "
" water.....	34,760 "	43,429 "
" fuel.....	12,100 "	12,109 "
" tender loaded.....	81,114 "	94,880 "

Both classes of engines were fitted with four-wheeled bogie trucks and had four wheels coupled. The diam-

eter of the driving wheels of the compound was about two per cent. greater than that of the simple.

The Southern compound was of the four-cylinder type, with a complete set of valve motions for each cylinder. Both driving axles were used for connections, the front one being a crank axle. The simple engines, on the other hand, had outside cylinders with a single straight main driving axle.

The grate area was practically the same in both types and the air space between the bars was in the neighborhood of one-half the whole area.

The boiler of the Eastern engine consisted of two cylindrical shells, placed one above the other and connected at intervals. The lower shell was entirely filled by 304 ordinary tubes, 1.39 in. inside diameter. The firebox, which is made quite deep in order that the combustion of the fuel may be complete, is placed between the driving axles.

The boiler of the compound locomotive was of the ordinary type, with Belpaire firebox, and contained 118 tubes, 2.56 in. inside diameter, which had a free sectional area for the passage of the gases about 10 per cent. greater than those of the simple engines, an increase that facilitated the draft. As the firebox was raised at the back end in order to clear the rear driving axle its cubical contents were considerably less than in the simple engines.

The fire was easily maintained in both engines, and required only ordinary ability on the part of the fireman. While there was no difficulty in running the compound engine, a certain amount of skill on the part of the engineer was required in order to adjust the point of cut-off in the two groups of cylinders, so that the steam would be used to the best advantage. In fact the points of cut-off for the groups of high and low pressure cylinders ought not to be arbitrarily fixed with reference to each other, but should be adjusted in actual service in order to obtain the best results. This adjustment, which is the most important part of the running of the engine, merely requires a little time and an intelligent engineer.

The acceleration of the train to speed either when working compound or with boiler steam admission direct into all of the cylinders, was more rapid in the case of the compound locomotive than in the case of the simple engines. As a general thing the most rapid acceleration could be obtained by admitting boiler steam to the low-pressure cylinders and opening the exhaust from the high pressure directly into the atmosphere. This method of operating considerably increased the steam consumption, but caused no material inconvenience, because it was not necessary to keep it up long. Finally, when the engine cannot start a train when working as a compound, it is possible to increase the drawbar pull by admitting steam for a short time to the large cylinders by means of a special valve, and that, too, without any preliminary manipulation of the exhaust from the small cylinders. This method of procedure, to which frequent recourse was had during the trials, invariably enabled the compound engine to start the trains even when they were very heavy and standing upon a curve, thus appearing to be entirely sufficient for all circumstances arising in the service of the Eastern Railroad.

On favorable grades and when the hauling of the train did not require any great tractive effort, the compound locomotive did not seem to possess any material advantage over the simple engines. But on adverse grades, or where the drawbar pull required that the point of cut-off should be later than 25 per cent. of the stroke, the compound worked more easily than the simple engines. In the case of the latter engines when running with a late cut-off, it was essential that the engine driver should pay very close attention to his fire in order to avoid tearing it to pieces by the blast.

In hauling the test trains, the cut-off of the low-pressure cylinders was always later than in the high, the difference between the two points being greater as the drawbar pull to be developed decreased. For example, in hauling up a grade the points of cut-off were so adjusted as to give a cut-off of 55 per cent. of the stroke in the low and 60 per cent. in the high pressure cylinders or 45 per cent. of the stroke in the low and 55 per cent. in the high pressure cylinders. On the average profile, however, a cut-off of 35 per cent. in the low and 55 per cent. in the high would do well, while the latter could even be increased to 60 per cent. where it was desired to run at high speeds. On level stretches or on down grades, the point of cut-off of the low-pressure cylinders could be raised to 60 and even to 70 per cent. of the stroke, while that of the high pressure could be still further reduced.

It should be borne in mind that the main object of the tests was to ascertain the comparative merits of these engines, in hauling the ordinary winter trains on the Eastern Railroad as well as the heavier ones of the summer traffic; while determining, at the same time, the consumption of oil, water and fuel for each engine.

The fuel used was the mixture of fine coal and briquettes used in regular high-speed service on the Eastern road. The briquettes were made of semi-bituminous coal. An analysis of the fuel showed:

Volatile matter in briquettes.....	18.92	per cent.
" " fine coal.....	19.88	" "
Ash in briquettes.....	4.66	" "
" " fine coal.....	5.45	" "

All of the engines did their work with ease, and, except in those trials where they were overloaded, they ran on time. The loading was practically the same.

averaging 103 tons for the simple engines and 105 tons for the compound.

The water consumption for the compound averaged 230 lbs. per train mile or 1.9 lbs. per ton (2,000 lbs.) per mile. In the case of the simple engines these averages were 239.29 lbs. and 2.00 lbs. respectively.

The consumption of fuel and oil for the period covered by the tests included that used in kindling the fires, which was done 41 times in the simple engines and 42 in the compound. The average consumption of fuel in the compound locomotive per train mile was 30.9 lbs. and 0.27 lb. per ton (2,000 lbs.) mile; the corresponding averages for the simple engines being 32.63 lbs. and 0.296 lb. The compound, therefore, effected a saving per train mile of 5.4 per cent. on the average, though when making a comparison with one individual engine the percentage was greater or less according to the engine used as a basis of comparison. The saving per ton mile was 5.6 per cent. In the case of the water evaporated per pound of fuel, the compound was inferior to the simple engine by 1.9 per cent. The oil consumption of the compound was 0.17 lb. more per train mile and 0.002 oz. more per ton (2,000 lbs.) mile than that of the simple engines, an average consumption of about 13.7 per cent. over that of the simple engines.

During the time that the engines were being tested with an overload, there were many and wide variations in the atmospheric conditions. The temperature varied from 19.5 deg. to 57 deg. Fahr., and there were several storms of rain and snow. Yet in spite of this the engines hauled trains weighing from 197 to 200 tons on time, the speed ranging from 36 to 48 miles an hour. In this trial the average saving in water consumption by the compound engine was 9.4 per cent. per train mile and 8.9 per cent. per ton mile. In fuel consumption the compound gave an average of 43.56 lbs. per train mile and 0.20 lb. per ton (2,000 lbs.) mile; that of the simple engines being 49.83 lbs. and 0.225 lb. respectively. This gives an effective saving by the compound of 12.7 and 11.2 per cent.

It will be seen that the saving in water by the compound was about the same under both conditions of service, while that of the fuel showed a remarkable increase in the case of overloading. The actual value of the results was, however, vitiated by the variable conditions under which the work was done, as well as the fact that the drivers were paying more attention to hauling the trains on time than to saving fuel. But under the overloading the evaporation of water per pound of fuel was higher in the compound than in the simple engines, it being 7.11 against an average of 6.85 for the simples. A table giving a comparison in detail of all of the work done shows a fuel saving for the compound ranging from 5.49 to 8.18 per cent. for ordinary trains, and of 17.73 for heavy trains; a difference which is attributed in part to the fact that the steam pressure in the simple engine was 170.28 lbs. per square inch, and 198.66 lbs. in the compound, as well as to the conditions of draft which were unfavorable to the simple locomotives.

In summing up the results of the test the author gives an advantage to the compound in a fuel saving of from 5 to 12 per cent., according to the weight of the train, a saving in water of from 8 to 9 per cent., and a few other minor points; while to the simple engine he gives a lower first cost and a decrease in the expense of maintenance. In giving an estimate of the probable actual saving to the Eastern Railroad resulting from the adoption of the four-cylinder compound locomotive, the author places it at 3.2 lbs. per train mile, or \$0.00586. Admitting the life of an express engine to be 20 years, and that its annual mileage would be 54,000 miles, its total mileage would be 1,080,000. The cost of such an engine would be about \$2,420 more than that of the simple. With an interest charge of 3 per cent., the author calculates the annual supplementary charge to be

Hence the annual supplementary expense per train mile would be \$0.003. The expense of renewing the crank axle he places at about \$0.0033 per mile, so that the total extra expense involved in the use of the four-cylinder compound would be \$0.0033 per engine mile, while the saving in fuel would amount to but \$0.00586, making a direct loss of \$0.00044 per mile or \$23.76 per year as the result of using a four-cylinder compound locomotive. But under the peculiar conditions existing on the railroad under consideration, the use of the four-cylinder compound locomotive would involve a greater expense than that given in the above figures, and a balance would only be shown in its favor by an increase in the price of fuel. On the other hand, it is expected that a rearrangement of the blast pipes in the simple engines, accompanied by either a superheating or at least a drying of the steam, coupled to a modification of the present form of link motion, will decrease the coal consumption of the engines and, at the same time, increase their power. Hence the only condition that would necessitate the adoption of a four-cylinder compound locomotive would be where a maximum amount of tractive power should be required from a boiler of strictly limited dimensions.

### Recent Improvements on the Baltimore & Ohio.

(Concluded from page 782.)

AT PITTSBURGH.

The work now being done by the Baltimore & Ohio in improving its Pittsburgh terminals may be divided into two parts: First, the revision and enlargement of the

freight yards in Pittsburgh, together with the improvement of the approaches to the same; second, the construction of the Glenwood trestle and the new freight yards at Glenwood station.

The work in the Pittsburgh yards extends from the passenger station to a point about one mile outside, and a plan of the improvements is shown in Fig. 1. The tracks enter the city along the north bank of the Monongahela, along which the railroad owns considerable land. The utilization of this property to best advantage has necessitated the changes now being made. The tracks—two main and a third track—run for several miles, as they approach the city, directly along the north side of Second avenue, a busy street, on which there is a double-track electric street railroad. Instead of continuing along the north side of this street until near the Pittsburgh station, as now, the line will be made to cross to the south side, so as to reach the ground on the river front to be used for new yards. This crossing of Second avenue, shown in Fig. 1 near the roundhouse A, is effected by means of a heavy three-tracked latticed bridge, having a clear span of 139 ft., and built on an extreme skew. The approach to this bridge from the east is made on an earth embankment 1,150 ft. long, the perpendicular face of which along Second avenue is supported by a heavy retaining wall of rock-faced ashlar. This wall has an average height of 18 ft., and, together with the abutments to the bridge over Second avenue, contains about 8,300 cu. yds. of masonry. These changes in line have necessitated a relocation of part of Second avenue, a portion of what was formerly the street becoming a part of the railroad's right of way, while a section of the street has been transferred to ground heretofore used by the company's main tracks. The old location of the main tracks is shown approximately in Fig. 1 by the

double track, and a new freight yard near Glenwood station, with a capacity of 1,000 cars. The object of the work is to utilize a portion of the river front at this point for yard room, to relieve the main tracks from Marion Junction to Glenwood, and to render it unnecessary to run freight trains over the objectionable crossing at Hazelwood, the next station east of Marion.

line across Second avenue at Hazelwood before they could proceed on their way. This was the cause of constant blocking of traffic on Second avenue. Trains may now be sent on or off the main line from the Glenwood yards in the direction in which they are going.

CUMBERLAND AND CONNELLSVILLE.

CUMBERLAND AND CONNELLSVILLE.

At Cumberland, Md., on the Pittsburgh Division, extensive plans have been made for a new yard and new repair

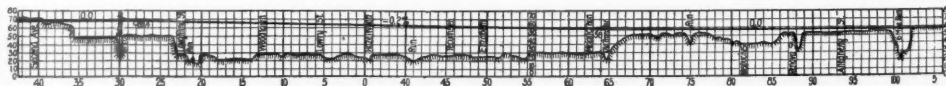


Fig. 3.—Profile of Glenwood Cut off—Baltimore & Ohio Railroad.

Wheeling Junction to Marion Junction will be used for passenger trains, while freight trains will leave the main line at Wheeling Junction and proceed by way of the Glenwood cut-off, as it is called, to the new yards. Passing these yards freight trains again return to the main tracks and after traversing these for a short distance they reach the Pittsburgh Junction Railroad, forming the link between the Pittsburgh Division and the Pittsburgh & Western, the B. & O.'s connection to Chicago. The Glenwood tracks thus not only serve to utilize the shore property near Glenwood, but to relieve the passenger tracks between Wheeling Junction and Marion Junction.

The "cut-off" shown along the bank of the river, in Fig. 2, is about two miles long, 4,900 ft. of which is trestle work, owing to the low level of the river front. Leaving the main line at Marion Junction, and running toward Baltimore, the tracks cross Second avenue on a curve, at grade. After running on an earth embank-

shops. A considerable part of this work has been done and it is being steadily carried forward. Of this work three of the seven sections of the new yard have been graded and are ready for the tracks, and the grading of the remaining sections is going on. The total capacity of the new yard will be 3,175 37-ft. cars, being divided into 990 cars in the general yards, 820 in the coal yards, 640 in the storage yard and 725 in the car repair yards. This yard lies east of Virginia Lane, between the main tracks of the road and the Chesapeake & Ohio Canal.

Of the buildings in the yard there have been completed the roundhouse, having 44 stalls, and the adjoining building containing the storehouse, machine shop and smith shop. There have also been completed the water tanks, storehouse for oil and waste, and sand house, coal chutes and ash pit near by. On the remainder of the buildings nothing has been done. The plans for these buildings include a two-story machine shop 140 x 300 ft., a smith shop 215 x 100 ft., and a boiler shop 120 x 300 ft.,

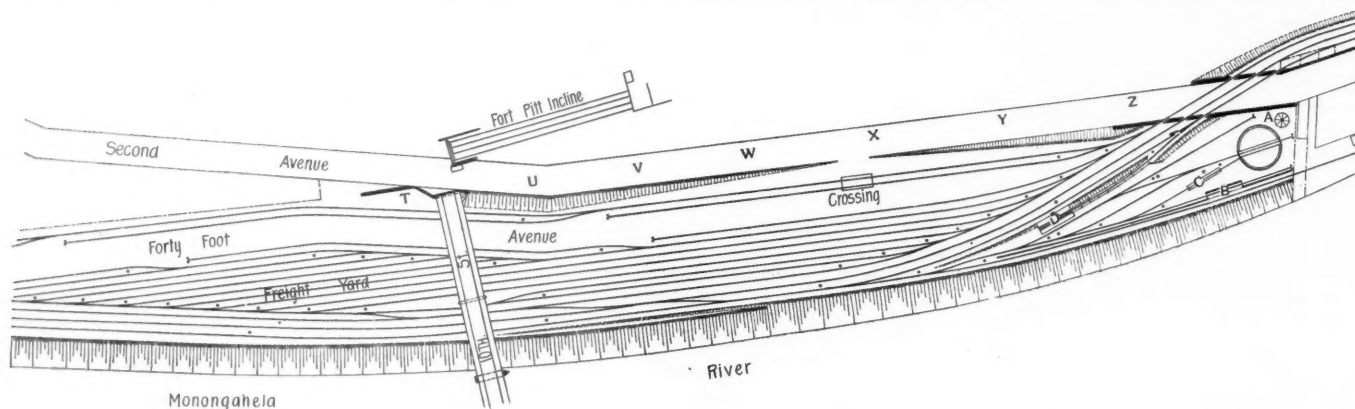


Fig. 1.—Terminal Freight Yard of the Baltimore & Ohio Railroad at Pittsburgh.

letters T, U, V, W, X, Y, Z. The expense of this change of location has been borne by the railroad, the work including the transferring of gas pipes and water mains, and the reconstruction of the electric car tracks, for about 900 ft. This work is now completed, as well as the walled embankment approaching the Second avenue bridge and the bridge itself. From here on toward the terminus the work consists largely in extensive filling along the river front to bring the ground up to the necessary grade. About 165,000 cu. yds. of earth will be required to complete this part of the work, adding about 70 ft. to the width of the yards. This work is now under way. As the plans show, the two passenger tracks run along the river front from the Second avenue bridge to the station, while the freight tracks and yards occupy the space between them and Second avenue. A 40-ft. paved street, called Freight avenue, runs through the yard for a distance of 3,000 ft. to facilitate the loading and unloading of cars. The capac-

ment for several hundred feet, the line crosses the tracks of the Monongahela connecting railroad (operated by Jones & Laughlin) on a pony truss of 93 ft. span. At the east end of this bridge the trestle work begins. The bents, which are 15 ft. apart, are supported on 1,800 piles. The length of the trestle is 4,900 ft., and its extreme height about 43 ft. It is provided with planked middle and outside walkways, with substantial hand-railing.

At the eastern end of the trestle the new yards begin. Fifteen of the proposed tracks in this yard are now done, giving a capacity of 650 cars, and this is all that will at present be built. To extend the capacity of the yard to 1,000 cars, as contemplated, will require much filling along the river front. The trestle and other parts of the work were finished and opened for traffic last June.

The cost of the Glenwood work was about \$250,000, and that of the Pittsburgh work, when completed, will

containing a 25-ton overhead crane. These are all at the west end of the yards. Then comes a transfer pit and then an erecting and paint shop 140 x 450 ft., with capacity for 44 locomotives. A second erecting shop, east of the first, also 140 x 450 ft., has a capacity of 36 locomotives, the south end of the building to be used as a tender shop, with a capacity of 16 tenders. East of this shop again there is another large building 180 x 450 ft., divided into a car-erecting shop, 180 x 350 ft., with a capacity of 68 cars, and a smith shop 100 x 180 ft. Two other large car shops, still further east, are planned, each 150 x 450 ft., with a capacity of 44 cars each. These various buildings are separated by transfer pits and have tracks at north and south ends.

South of these shops are to be located the various covered platforms and storehouses for material, one of these buildings having a second story for use as offices. South of these again is to be the car repair yard.

In the southeast corner of the yard will be located the saw mill, 70 x 250 ft., and the iron and brass foundry, 80 x 200 ft., containing a cupola furnace and a 5-ton overhead crane. The pattern room will be on the second floor of this foundry.

It may be readily seen that the completion of these shops will require a large amount of time and money, but it is the policy of the receivers to complete the plant as soon as possible.

At Connellsville, Pa., the contract has been let for new freight and passenger stations to the Fayette Lumber Co., Limited, of Connellsville. The passenger station will be a one-story brick building, 31 ft. x 110 ft., with a 10 ft. platform along one side and end, and a 17-ft. platform extending 480 ft. along the track side of the building. The building will be of brick laid in cement mortar, with a slate roof. It will be steam heated, and have both gas and electric lights. It will contain a baggage and express room, ladies' waiting room, ticket office, general waiting room, smoking room and telegraph office. A deep, sloping roof, arched windows and exposed timbering give the building a picturesque appearance.

The freight station will be a one-story frame structure, 40 ft. x 161 ft., having a 6-ft. platform on three sides and a 4-ft. platform on the fourth. It will contain freight offices and a freight room 38 ft. x 130 ft.

At Clarksburg, W. Va., a new freight house is also being built, the contract for this work having been let to J. B. Brady & Bro., of Baltimore. This building will be 207 ft. x 58 ft., of brick, with a slate roof,

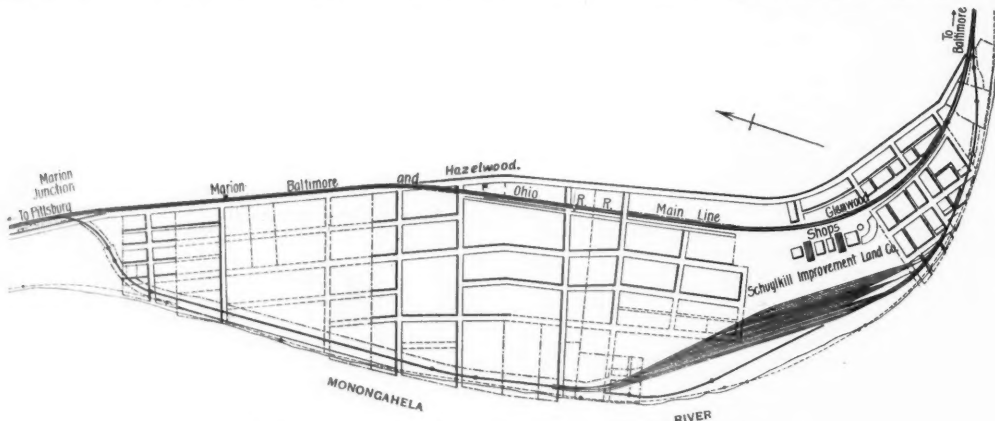


Fig. 2.—Glenwood Improvements—Baltimore & Ohio Railroad.

ity of the present freight station is 64 cars, and the new yards will contain room for storing 290 cars 37 ft. long. The Try street yard has a capacity of 50 cars. At the east end of the yards, near the bridge over Second avenue, will be located the turntable, water tank, coal chutes and ash pits.

The work near Glenwood, five miles from the terminus, includes one bridge, a trestle 4,900 ft. long, both

be close to \$240,000. The Glenwood trestle is a model of solid construction, about 3,000,000 ft. of Georgia pine going into it. This work, as well as that at Pittsburgh, is from plans by Mr. W. T. Manning, Chief Engineer.

The crossing at Hazelwood has hitherto been a source of constant friction between the railroad company and the city, inasmuch as all trains made up in the old Glenwood yards had to be backed down to the main

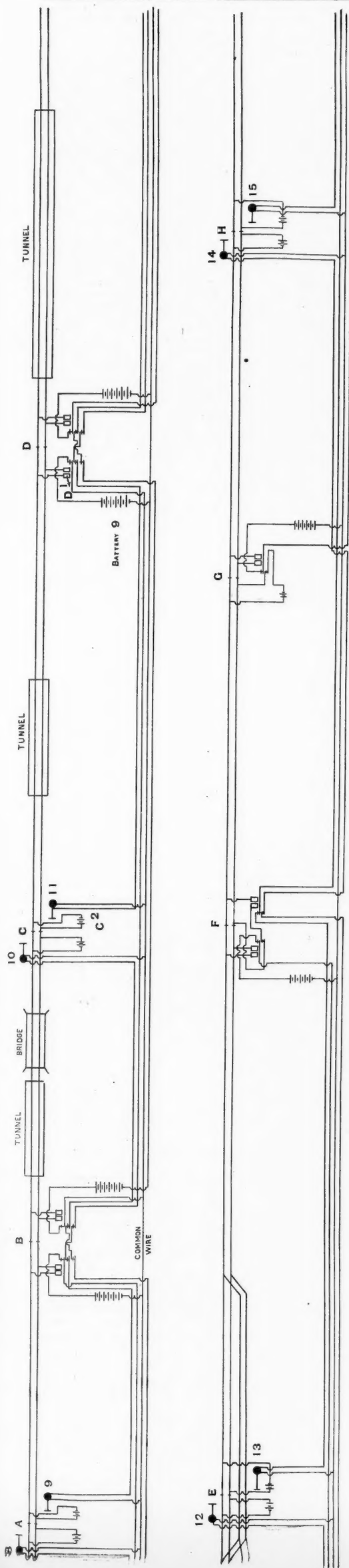


Fig. 1.—Electric Circuits, Rail and Wire, for Automatic Block Signals—Cincinnati, New Orleans & Texas Pacific Railway.

Automatic Block Signals on the Cincinnati, New Orleans & Texas Pacific.

The above-named road now has 132 miles of its line, all single track, equipped with automatic block signals, and as the policy of gradually extending the use of these signals has been consistently maintained for a number of years we have got from Receiver Felton a few notes concerning them, which we give herewith, together with a view of one of the enclosed disk signals made by the Union Switch and Signal Co.

The introduction of automatic electric block signals on this line began in 1891, when a few isolated signals were placed at tunnels. Since that time frequent additions have been made until at this time there are several long sections of the road protected by consecutive overlapping blocks, and all the tunnels, 27 in number; there being a total of 160 signals, covering 132 miles of the most difficult portions of the road.

The signals in use are the Union and the Hall; the greater portion are the former, of which two forms are used, the disk (enclosed) and the "banner" or "clock work" signal. The Hall signals are all of the disk pattern. The circuits and manner of operation are practically the same in all, the signals being held at safety, their normal position, by the direct action of magnetism. In the disk signal, when the restraining influence of the magnet is withdrawn the disk falls to danger by its own weight; the disk being drawn back to safety again by the direct action of the magnet when the train leaves the block. In the clock work signal the banner makes a quarter revolution on a vertical axis whenever the clockwork is released by the opening or closing of the electric circuit controlling it, the power to operate the clock work and revolve the banner being obtained from a weight suspended in the body of the signal post. This weight requires occasional winding.

The block sections vary in length from 1 mile to 3½ miles, according to the local conditions. Trains in each direction are governed by the signals on the right-hand side of the track as seen by the engineman. The main electric currents are all conveyed by the rails of the track, the track circuits operating relays which control the wire circuits operating the signals. The track circuits are so divided as to make an over-lap for every signal. The over-lap, so called, extends the control of the signal for any one block over into the next block as far as is desired, the average distance being half a mile. The limit of each over-lap circuit is indicated by a white post bearing the number of the signal controlled by it. The beginning of each main circuit, 210 ft. in the rear of the signal, is indicated by a triangular iron sign about 7 ft. high, a sketch of which is shown in Fig. 2. The track circuits are separated from each other by insulated joints.

The important rule governing the movement of trains through these block signals, which differs from those in use on double-track roads, is:

"If the signal is red before the train enters the block or is white and does not change to red before the train reaches the signal it indicates danger and the train must stop; send a flagman in advance immediately; wait five minutes after the flagman has started and then proceed under full control, not exceeding six miles an hour, until the obstruction is reached or the train passes out of the block."

The exceptions to this rule are:

"Trains of an inferior right approaching a meeting point within the limits of a block may pass the red signal and proceed to the siding under full control."

When following trains or sections are detained outside the block each train or section will allow the preceding train or section five minutes to clear the block, where the block is continuous. If the block is not clear at the expiration of the five minutes the train will proceed under full control expecting to find the block occupied by a preceding train."

In addition to the usual telegraphic reports from enginemen who find signals out of order, the signals governing trains moving in the opposite direction must be observed by the flagman when the train passes out of the block, and reported if they fail to clear

Fig. 1 is a sketch showing three consecutive blocks, with signals protecting trains in both directions. The track is divided into sections on the sketch. The ends of the track sections have been designated by letters A, B, C, etc. The track sections are A-B, B-C, C-D, etc., the signal sections being A-C, C-E, E-H. Table 1 shows the movement of a southbound train, though it should be

TABLE 1.—SIGNAL POSITIONS DURING MOVEMENT OF A SOUTHBOUND TRAIN, SHOWING HEAD AND REAR PROTECTION.

NOTE.—Odd numbered signals govern southbound trains. Even numbered signals govern northbound trains. "C" means clear signal. "R" means red signal.

Numbers, 23	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
A to B.....	R	C	R	R	C	C	C	C	C	C
B to C.....	C	C	R	R	C	C	C	C	C	C
C to D.....	C	C	C	C	R	R	C	C	C	C
D to E.....	C	C	C	C	C	R	R	C	C	C
E to F.....	C	C	C	C	C	C	R	R	C	C
F to G.....	C	C	C	C	C	C	C	R	R	C
G to H.....	C	C	C	C	C	C	C	C	R	R
H.....	C	C	C	C	C	C	C	C	C	R



Fig. 2.

understood that a train on a section holds certain definite signals at danger regardless of its direction, as, for instance, a train going in either direction in section C-D holds signals Nos. 9, 11 and 12 at danger. The manner in which this is shown in the drawing will be readily understood by following the connections to one signal, say No. 9. The presence of the train in section C-D opens the relay D<sup>1</sup> by short circuiting practically all of the current from battery C<sup>2</sup>. The dropping of the armature of D<sup>1</sup> opens the three contact points, and it will be seen that the uppermost one of these opens a wire running, on poles, to signal 9. The same wire, it will be seen, runs through two relay points at B so that signal 9 may be similarly demagnetized by trains running or standing in sections A-B and B-C.

To illustrate the head end protection, consider a train going from E to D and beyond. When the first pair of wheels passes D, signal No. 9 is set at danger in addition to No. 11, which has been previously set.

In the table it will be seen that when a train enters section A-B it sets No. 9, Nos. 7 and 10 having been previously set; reaching section B-C, signal No. 7 is cleared and No. 12 is set; reaching section C-D, No. 10 is cleared and No. 11 is set, and so on from section to section, ample protection being always provided in both directions.

While in the early history of automatic block signals there were faults due to apparatus, it may now be said, as a rule, that any failures except those due to lightning can be traced to some fault of human agency, generally oversight of maintenance men. Malicious tampering is rare on the Cincinnati Southern.

The signal instruments are protected against lightning by one-Ampere fuses, the burning of which gives a danger signal. Many experiments have been made with so-called lightning arresters, but so far with only partial success.

The percentage of failures from all causes to the number of signal movements is very small, being one failure to about 3,528 movements. The original cost of the automatic signals in place has been about \$400 each. The average cost of maintenance per month per signal for the year ending June 30th, 1897, was \$7.40.

Discipline on the Soo.

The Minneapolis, St. Paul & Sault Ste. Marie, which abandoned suspensions of trainmen on March 1, 1896, and adopted a debit and credit record, has lately modified its plan, adopting a schedule which really makes a man's seniority, as affecting his chances for promotion, dependent upon good conduct as well as upon mere lapse of years. In the original plan, adopted last year, each man, at the start, received a "credit" of 60 days, provided he had been in the service two years or more. From the circular then issued we are unable to learn precise details of the operation of the plan, but as now modified, beginning Aug. 1, 1897:

"All credits and debits will be erased, and a new account opened. Each engineer in good standing on Aug. 1 will receive a credit equivalent to his term of service in months. For example: a man in the service 10 years will receive a credit of 120 months, and for each year of perfect service thereafter, he will receive an additional



Fig. 3.—Union Disk Signal—C., N. O. & T. P. Ry.

credit of 12 months, in place of 35 days as before. Should he incur a debit, it will be deducted from his account, as for example, one month reducing his credit to 119 months, and reducing his seniority one month."

"Each account will be settled monthly, and a debit one month will be no bar to his receiving a credit on the following month, or at any time that it may be due, the monthly settlements taking the place of the annual, as before.

"For the reason that under this plan, the lowest debit is one month, and for the reason that a debit of one month would be too severe a penalty for a minor offense, it is deemed best to abandon the plan of making debits for less than 30 days. Instead, reprimands will be given when the offense does not result in loss or damage to the property of the company, delay or inconvenience to trains, and for the minor offenses not necessary to detail, three reprimands to one employee being equivalent to one month, except as follows:

"One reprimand will be canceled by a perfect record for the three months subsequent to the date of its issue.

"Two reprimands will be canceled by a perfect record for six months subsequent to the date of the second issue."

"Three reprimands in one month is equivalent to a debit of one month."

"A generally poor record will call for special consideration from the mechanical superintendent, and may, after a hearing, bring dismissal, though a specific offense sufficient of itself to cause dismissal may be absent."

"The credit system will be based on general meritorious service, with excellence in the following special directions:

"Punctuality of trains when the schedule time is made, without exceeding the speed limit and without overtime."

"Economy in fuel and lubricants and cost of repairs per 10,000 ton-miles made."

"A freedom from disagreements with other employees of the company when in discharge of their duties, who are not subordinate to engineers."

"Non-affiliation with labor organizations under whose by-laws strikes can occur."

The General Manager's circular gives, in addition to the foregoing, the usual items for which merits or demerits are given and in the preamble says:

The leading objects of the system of discipline by record are:

"To avoid the loss of time and wages to employees to avoid the incorrect and pernicious feeling on the part of an employee who has been suspended (and thus lost time and money) that he has paid the company for the loss and trouble he has caused, and that he can settle again in the same manner. . . . No continuous service performed by men can be perfect, but a high standard of discipline will produce a high class of service."

The foregoing is from the circular to enginemen. Similar regulations prevail, we believe, in all departments of the train service and also among yard trainmen.

#### Power Distribution and Multiphase Current Transmission for Street Railways.\*

BY MAURICE HOOPES,†

[In the first part of this paper the author discusses in some details the comparative merits of the different systems of transmission in common use. These are classified under the following heads: (1) By a special generator; (2) by a booster; (3) by the three-wire system; (4) by the alternating current. He calls particular attention to the fact that where it is necessary to select from the foregoing list the most suitable system for any particular case, there are many conditions to consider before coming to a wise decision. We publish in full the latter part of the article, inasmuch as this portion in particular discusses the advantages and disadvantages of the three-wire and the multiphase systems.]

The "three wire system," although very useful in lighting work, has been of little service in railroad distribution. Its value for the latter purpose has been considerably over-estimated, although there are places where its use has resulted in the maintenance of satisfactory potential on sections of track, using the same copper, when the usual system could not approach doing it. The advantage of the three-wire system is based on the fact that it enables the use of double the usual potential for distribution, thus in the perfect case requiring but one-fourth the copper to transmit a given current at a given loss. This law, that the amount of copper varies inversely as the square of the potential, is due to the fact that doubling the voltage halves the current for a given amount of energy. The same percentage of loss allows a loss of twice the number of volts, and this, with but half the current, admits of the use of copper having four times the resistance, hence one-fourth the weight. The "perfect case" just cited is one in which no third or "neutral" wire is necessary. Such a one does not exist in practice, and this neutral wire has to be supplied to conduct the excess of the current used on one side of the system over that used on the other, between the generators and the motors. In railroad work the rail is used as the neutral conductor. It is seldom that a whole road is operated on this system, the common practice being to apply it to only those parts on which the ordinary system is insufficient. Where there are, but one or two sections to operate with the reversed potential, the switchboard described may care for them satisfactorily. If one generator is made to build up with reversed polarity, and is coupled into the auxiliary bus, it will handle such feeders as may be thrown upon it as the negative side of a three-wire system. The generator may have its residual charge reversed in a number of ways, one of which is to have the shunt field wired through a double throw switch on the machine, arranged to disconnect the field coils from the armature, and connect them in the reverse direction to a pair of charging wires fed from the switchboard. The machine may have its residual charge brought back to the usual direction by the commonly used means of throwing in the positive and equalizing switches, with the negative open, and allowing the current shunted from the series coils of the other machines to energize its series coil. Where three-pole switches are used on the generators, the shunt field double throw switches may be omitted, and the field reversed through the series coil by using an X-shaped pair of contact pieces insulated from each other at the point of intersection. These may be pressed against the switch jaws in such a way as to reverse the current shunted from the other series coils through that of the machine to be reversed. Where the three-wire system is the regular system of operation, and the sections are divided equally between the two sides of the system, a regular three-wire board is preferable. For a less general use of the system, the method described answers as well. The arrangement then becomes the same as that of the "special generator," with the polarity reversed, and the potential on the machine may be raised above normal, and the advantage of greater allowable drop in the copper added to that of the saving in track drop, due to the reversed current flow.

The writer has said that the value of the three-wire system in railroad service has been considerably over-estimated. This statement probably needs explanation. In lighting work the three-wire system saves 62½ per cent. of the copper. Each wire has to be but one-fourth as large as with the two-wire system, but it is usual to make the neutral of the same size as the other wires,

thus requiring three wires, each of one-fourth the size of those of a two-wire system; hence the use in the three-wire system of three-eighths, or 37½ per cent., of the copper necessary in the two-wire system. Because this is true of lighting work it is often assumed to be true of railway work. If it is not, however, and in no case where the track renders any appreciable service as a conductor can the saving from the adoption of the three-wire system approach the above figures. In general its use will make a gross saving of the loss in track (assuming that there is no copper paralleling the track that may be used as a positive feeder). The net saving will be this gross loss in track less the track losses due to the passage of current from car to car, and of the excesses of current due to lack of balance, back to the power station, and the increased overhead loss due to the greater drops in the divided feeders than in them when combined.

In the selection, from the various systems of distribution of the one best adapted to a particular instance, there is always a large number of variable factors to consider, and usually more or less speculation as to the values of certain ones on which no accurate data are accessible. This makes it impossible to work from fixed laws, and demands individual consideration of each case. For these reasons there is considerable room for divergence of opinions in the matter. The writer has given his ideas as to the comparative infrequency of cases in which the three-wire system is desirable. The booster has a very much more general application, and is suited to a greater number of cases than in any one of the other systems. Nevertheless, wherever work can be handled by a special generator, it should be, unless the change involves abandoning existing apparatus. The last method saves considerable over the booster, and is preferable for its simplicity. The only limiting condition to its use is satisfactory regulation. The alternating current system, with rotary converter substations, competes with the booster system and special generator in cases where the load factor (the ratio of average to maximum load) is high, and where the regular 500 volts transmission will suffice during only a few of the 24 hours. In such a case, the copper losses, because of the length of time during which they are excessive, are so great that they may often exceed the entire expense of an alternating transmission system. The latter system also enters into competition with the independent power station for that class of business that is too remote from an existing station to admit of satisfactory handling by the other transmission methods, and too small to furnish load for such a station as may approach in economy the station from which the alternating transmission would be operated. Cases of each kind arise with city roads in their needs for transmission to suburban centers of load, and with interurban roads. The roads which the city station receives from the suburban centers have usually a very low factor. At morning and night they are excessive, and through the remaining hours comparatively light. Were an alternating transmission system installed for such use, it would probably lie idle for a large part of the time, its copper being used to transmit direct current. During the heavy hours it could be called into service. This same service might be rendered by raising the voltage on the direct current feeders by use of the special generators, and allowing the loss, which has been from 5 per cent. to 10 per cent. during the light load, to become 25 per cent. to 30 per cent. In this way, the line may carry three or four times as much current, and maintain the voltage at the distant end.

In comparing the systems, it is necessary to compute the annual cost of each, including the items in the following list:

#### ALTERNATING CURRENT.

Fixed charges and repairs on main station static transformers, if any, and on sub-station static and rotary transformers and accessories.

Fixed charges on sub-station land and buildings. Sub-station labor.

#### DIRECT CURRENT.

Interest, depreciation, and repairs on such increased cost of engines and generators, as is occasioned by their being fitted to furnish increased voltage.

Cost of fuel to produce output representing difference between losses in direct current feeders and those in alternating current feeders and transformers.

This assumes that the same amount of copper is used in each system, that the alternating system does not remove the need for sufficient copper to handle the load with direct current during a part of the time, and that this amount of copper will suffice for heavy loads by means of the increased direct current potential transmission. Should the load be of such a nature that the alternating transmission would be operated throughout the whole time, there may be a correction made in its favor of the annual cost on the increased amount of copper necessary for the direct current system over that for the alternating system. It is probable that the direct current generator and engines need not be increased in cost more than 10 per cent. by the requirements of the increased voltage. The writer has said that he is operating satisfactorily with machines designed for the alternating current system, which cannot be given exact money values, are the danger to life from the increased voltage; lack of uniformity in equipment, making lack of flexibility in stations (where, under the other arrangement, any generator may serve any demand), and the danger of delays due to the increased complication of the system, it sometimes requiring 15 or 20 minutes to start the substation machinery and get it into service after it has been stopped in the midst of load by accident. These points of disadvantage are very important ones, and operating companies can well afford to expend considerable money to avoid them. Especially is it undesirable to install for railroad work a system which may be disturbed by the extreme overloads such work introduces, and which cannot be restored to an operative condition immediately the load is brought within bounds. With the rotary transformer system any short circuit or extreme load, which is not relieved by the substation direct current circuit breakers, may stop the rotaries and shut the power off the line during the long interval it takes to start them and put them into service.

In the comparative estimate, the results depend more upon the load factor than any other condition. With it sufficiently high, the alternating transmission may show an economy over the direct current for areas within a very few miles of the power station. Unfortunately, however, the yearly load factor is usually very low on railroad work. With such a condition it is cheaper to have excessive losses in copper at times of heavy loads than to carry the necessary equipment of alternating transmission apparatus to keep the losses down at such times. The railroad manager naturally insists that the voltage be maintained reasonably near its normal value over the whole road at times of heaviest business. Estimates that show immense costs for copper to accomplish this under the regular distribution system make him turn to the consideration of additional power stations

and multiphase transmissions. If he can be shown that he may care for his maximum loads over the existing copper by simply raising the voltage on the station end of the sections of heavy loss, and pay for the loss with coal instead of with interest and depreciation on a great amount of additional machinery, he is likely at least to determine carefully which he can better afford to do. While, in the writer's opinion, the majority of cases may be best handled by direct current distribution, there are many instances of need for a distribution system where none but the alternating current system is applicable. Where water powers are used, they are almost always so remote from the center of load that very high potentials must be used for economical transmission. Long interurban roads operating so few cars that load can be had for only one power station, bring a condition where distribution must be so accomplished by substations on the alternating system. The Lowell transmission presents a case where it was a problem whether to care for the new territory with a separate station, or to transmit from the existing station. So much has been written about the multiphase current system that was decided upon and installed there, that it is unnecessary to attempt a description of it. Mr. Sullivan, the General Manager of the company, has kindly furnished the writer with a copy of the estimates from which the choice of systems was made. He states that operation justifies the estimate in its statement of the cost of the multiphase system. It showed the cost of power delivered to the trolley wire to be, for the transmission system, 70 per cent. of that for the separate power station. There were no figures showing what this work could have been done for with a booster system. Inasmuch as the latter method has been used successfully in place of the other, temporarily, it would be interesting to know its comparative cost. Tests of the Lowell system extending over 18 days show an all-time efficiency of 76 per cent. as measured from alternating generator output to rotary converter output, the losses being those of two sets of static transformers, line and rotaries. The maximum efficiency for any one day was 73 per cent. The voltage regulation at the substation is about equal to that of a well-governed steam driven power station.

The writer has said that the use of alternating currents for ordinary electric railroads is limited to the rotary converter system. This is due to the fact that alternating current motors, in their present state of development, are not adapted to the needs of such railroads. As yet their use for traction purposes is limited to a few European roads, of which the best known is in Lugano, Italy. Alternating motors have the disadvantages of limited torque and tendency to synchronism. This makes them poorly adapted for the uses of any line but one having long runs at practically uniform speeds, and few stops. These conditions are those of a through express service between cities. Accommodation and ordinary street railway services are such as can only be handled satisfactorily by direct current motors. At first notice, this fact seems rather contradictory to one's ideas of the flexibility of alternating currents. The ideal system has been thought to be one composed of a generating station containing large multiphase generators, with lines distributing current at a potential high enough to require but a comparatively small amount of copper, static step-down transformers, and motors that may be regulated throughout all desired variations of speed by merely changing the impressed E. M. F. with a controller depending upon the use of various ratios of transformation. This dream included the freedom from the care of commutators, and pictured a car equipment that would need a minimum of attention. Were it possible to realize all of these advantages, it is probable that the somewhat serious complication introduced by the necessity for two trolley wires might be tolerated. There seems to be little probability, however, of an early solution of the problem of adapting the alternating motor to the intermittent work of the street railroad.

#### Automobile Vehicle—Scotte System.

According to the Austrian *Monthly Journal of Public Works* a form of "automobile" has been recently tried in France, which may best be described a steam motor omnibus which carries passengers and hauls a trailer with a seating capacity of 12 persons. The new vehicle is intended for service on ordinary roads. It is mounted on four wheels of usual construction for heavy omnibuses, and has on the forward part of the frame or body a platform on which the boiler and engine are mounted. Back of this is the compartment for passengers. The entire body is 17 ft. long and 6 ft. wide over all, and weighs empty about 9,000 lbs.

As has been said, the boiler is placed just back of the forward axle, and is of the vertical type, designed to work at 170 lbs. pressure per square inch. The engine is vertical, with two cylinders, each 4½ in. in diameter and 4½-in. stroke. The engine is connected to the rear wheels by a chain and sprockets. The exhaust from the engine passes through a muffler, and can be turned into the water tank.

Behind the motorman's platform is a compartment with windows and seats along the sides. This has seats for eight persons, and at the rear is a platform like that of an ordinary street car, thus providing additional standing room.

The vehicle is steered by means of a lever fastened to a vertical spindle which turns the front axle. One man can, it is thought, attend to the engine and boiler and steer the vehicle as well. Water for the boiler is carried in side tanks and also in a tank under the floor of the passenger compartment, while the fuel (coke) is stowed in a box at the front end over the forward axle. This box holds about 440 lbs. of coke, a sufficient supply for about four hours, running at a speed slightly over seven miles an hour.

The trailer hauled by the motor wagon is simply a four-wheeled car or omnibus with end platforms, and having a seating capacity of 12 persons. It weighs 3,300 lbs. empty. The motor wagon is said to have cost about \$5,000, and the omnibus that it hauls about \$800.

Several of these "automobiles" have been built and are now undergoing trial under the direction of the government engineers in various parts of France, in order to test their capabilities on all kinds of roads and in all conditions of weather.

\* From a paper before the American Street Railway Association, Niagara Falls, N. Y., Oct. 20.

† Electrical Engineer, Lynn & Boston Railroad, Lynn, Mass.

### The Effect of an Earthquake in India.

The engravings reproduced from the *Indian and Eastern Engineer* show some of the results of a recent earthquake in India. Fig. 1 is a view of a section of tract between Haldibare and Moghal Hât, on the Cooch Behar State Railroad, which has a 2 ft. 6 in. gage, and is worked by the Eastern Bengal State Railroad. The engraving shows the effect on the track of the movement of the alluvial soil. Fig. 2 shows the destruction of the Munshai bridge on the same road.

The earthquake which caused this destruction was felt over a large area. Roughly speaking, the range of the shock extended from longitude 72 to longitude 96, east of Greenwich, and from latitude 12 to latitude 28, north; or over an area of more than 1,500 miles long and 1,000 miles wide. At Shillong, where, in 1882, a seismometer composed of a series of cylinders of various diameters was set up, the violence of the shock was sufficient to overthrow the whole series, the largest of which was 12 in. high by 9 in. in diameter. This means that at Shillong the earth had a forward and backward shake of a little more than 7 in., repeated once a second, with the result that at this place hardly one stone was left standing on another. The destruction was great throughout northern Bengal and Assam, and was considerable from Calcutta and Darjeeling on the west to Jorhat on the east, while it reached a maximum in Shillong, Cherrapunji and Tura, where the very boundary pillars were shaken to pieces.

An idea of the damage done to the permanent way and bridges of the railroads in this district can be had from the illustrations. Earth fissures and sand craters are reported throughout the alluvial plains from Purneah to Jorhat, and the drainage canals, tanks and wells were filled up over large areas. These were filled by an actual forcing up of the bottoms of the hollows, as shown by the effect on the piers of bridges which were forced bodily upward, as is the case of the far-side piers of the bridge shown in Fig. 2. A computation based on rather loose data shows the rate of transmission of the shock to be in the neighborhood of 112 miles a minute. This description is condensed from that which accompanied the cuts we have here reproduced.

### A Case of Corrosion.

The engraving which appears herewith was made from a spike sent to us by Mr. A. Torrey, Chief Engineer of the Michigan Central Railroad. Concerning this Mr. Torrey writes as follows:

"I send you a spike, which is a sample of many, taken from alongside of the inner rail of a curve, over which rail a great many refrigerator cars have passed. I infer, naturally, that the brine was the cause of the great amount of corrosion which has taken place, but the amount of corrosion exceeds by a great degree any that I have ever noticed, and it may be interesting to you." The thinnest part of the corroded spike calipers exactly  $\frac{1}{2}$  of an inch.

Fifteen months ago (July 24, p. 516) we published the outline of a section of a corroded rail also sent to us by Mr. Torrey. That rail had been in a team delivery track, ballasted with cinders, on which refrigerator cars were loaded. The web

of the rail had been corroded down to about  $\frac{1}{2}$  in. at the thinnest place, and the whole section might perhaps have lost three-fourths of its original area. Such examples are among the observed facts which scare people about using steel cars or steel underframes.

### Pioneer Railroad of Ohio.

BY CLARK WAGGONER, TOLEDO, O.

A recent article in regard to railroad history, especially of Ohio, stated that "the first railroad opened in Ohio was the Cleveland & Toledo, in 1853; that in 1836 a route for a railroad over substantially the same line, had been surveyed, being that of the Ohio Railroad; that this road was to consist of a track placed wholly on piles, and that the first pile was driven at Fremont (then Lower Sandusky) in June, 1836." Without reference to details, it becomes proper to state that the construction of the proposed Ohio railroad was commenced

at the point stated in June, 1839, three years later than as above stated, it having been the privilege of the writer to witness the driving of the first pile.

The real pioneer railroad of Ohio was the Erie and Kalamazoo, to extend from Port Lawrence (now Toledo) to the Kalamazoo River in Michigan. It was undertaken mainly at the instance and under the management of Port Lawrence parties, who obtained a charter from the Michigan Territorial Legislature in 1833. As the first suggestion of the kind in Michigan the bill met general ridicule, and was passed only as a personal favor to the member presenting it, who did so by request of a

ron  $\frac{3}{4}$  in. wide and  $\frac{1}{2}$  in. thick, the same being spiked to the wood rail.

In connection with this enterprise, and as in fact an essential part thereof, was the Erie and Kalamazoo Railroad Banking Company, organized July, 1836. But for the financial aid supplied by the issue of notes of this department the construction of the road probably would not then have been practicable. These notes were freely used and had circulation with other local bank issues until the collapse of "wildcat" banking caused by the "specie circular" issued from Washington, 1837, excluding from the treasury the notes of non-specie paying banks, a test which the greater portion of Western banks were not able to meet.

Such was the energy of the managers of the enterprise that the road was opened for business between Toledo and Adrian (33 miles) in September, 1836. At first it was operated with horse-power solely, with very uncertain times for departure and arrival of the single car constituting the "train" and no less uncertain as to the time occupied by the trip. The rate for through fare by the "Pleasure Car" was 12 shillings (\$1.50), with right to 50 pounds of baggage. Freight was taken at "four shillings" per 100 lbs., and salt at "eight shillings" per barrel. The matter of free transportation of passengers received early attention in the adoption of the rules that "there be no free seats, unless it be those of the agents or persons in the employ of the Commissioners when on the business of the road."

In April, 1837, it was resolved that the fare in the "Pleasure Car" between Toledo and Adrian be \$2.25; Toledo to Whiteford, 75 cents; Whiteford to Blissfield, 75 cents, and Blissfield to Adrian, 75 cents; and that former rates on the "Pleasure Car" be charged in the "Lumber (freight) Cars."

In July, 1837, the facilities of the road were greatly increased by the arrival of the pioneer locomotive from the establishment of M. W. Baldwin, of Philadelphia, being "Adrian No. 1." Referring to this accession a local paper said: "Its celerity has not yet been fully tested, but it is ascertained that it can move at a rate exceeding 20 miles per hour. At present it makes a trip and a half (between Toledo and Adrian) in 24 hours; the distance run being 50 miles. Subsequently it was stated that the locomotive came in from Adrian with six cars attached in the short space of 1 hour and 40 minutes, including stops," being 20 miles per hour. As indicating the advantages conferred on travelers by this road, it was stated that passengers from Toledo would arrive at Chicago two days earlier than if they took the stage at Detroit. The steamboat Detroit then ran on Lake Michigan in connection with stages from Adrian, the boat leaving Michigan City tri-weekly for Chicago, Pike River, Root River and Milwaukee.

In connection with the locomotive, the accommodations of the road were increased by the arrival of a new passenger car of a pretty though rather a singular and fanciful model, which was called the "Gothic Car." When full it seated 24 passengers, eight being in each of the three compartments, one being elevated above the others. An engraving of the car (from Waggoner's His-



Fig. 1.—Displacement of Track by an Earthquake—Cooch Behar State Railroad, India

brother prominent in promotion of the strange venture. At the time the entire route of the proposed road was understood to be within Michigan, the boundary dispute with Ohio (known as the Toledo War) not coming to issue until 1835, when it resulted in 11 miles of the eastern portion of the proposed railroad line being declared to be in Ohio.

One thousand shares, of \$100 each, having been subscribed to the capital stock, a meeting of the stockholders was held May 24, 1834, when the company was organized. It was then provided that \$1 per share of stock subscribed should be paid by Oct. 1, 1834. Subsequently the directors adopted a memorial, asking Congress for a grant of one section of land for each two miles of road



Fig. 2.—Munshai Bridge after an Earthquake—Cooch Behar State Railroad, India.

constructed, being 42,240 acres in all. December 2, 1834, it was decided to proceed with construction of 10 miles of road within one year, it being at the same time decided that the cross-ties of the track should be "split timber." Contracts were made for clearing, grubbing and cross-ties, at \$184.37 per mile; also for 400,000 lin. ft. of "wheel-rails." Subsequently, excavation was contracted for at 19 cents per cubic yard.

At the outset it was determined to construct the track wholly of wood, the rails to be in size 4 in. square. During the progress of the work this plan was changed by the addition of what was known as a "strap rail" of

tory of Toledo, 1888) has been often printed in various publications.

In 1835 the Territorial legislature amended the company's charter, whereby it was provided that "when the road should have paid the cost of erecting the same and expenses of keeping the same in repair, and 7 per cent. on all moneys expended, the road should become the property of the state and become a free road, except sufficient toll to keep the same in repair." Another amendment to the charter fixed the western terminus at Adrian, instead of the Kalamazoo River. Both these changes were no doubt due to the fact that, meantime

Toledo, the eastern terminus, had been found to be in Ohio instead of Michigan, such fact causing a degree of jealousy of the Michigan authorities as against Toledo. Like feeling of jealousy toward the road unexpectedly terminating in Ohio was shown in the prompt measures taken by Michigan for the construction of a rival line, known as the Michigan Southern Railroad, starting at Monroe and located through Adrian westward, and finally extended to Chicago.

The first annual report of the Erie and Kalamazoo road (December, 1837) showed the aggregate cost of line building, etc., to have been \$257,659.73. The year's earnings from opening (September, 1836) were \$55,821.52; from which deducting \$14,181.52 for running expenses and repairs, a profit balance of \$41,610 was left for dividends,

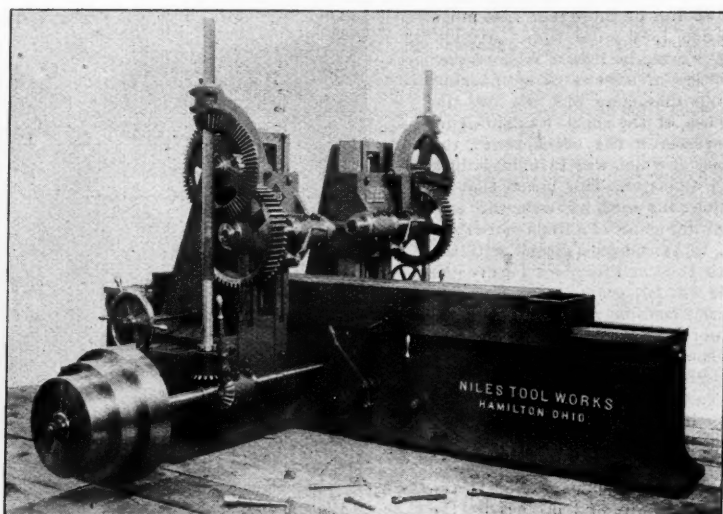
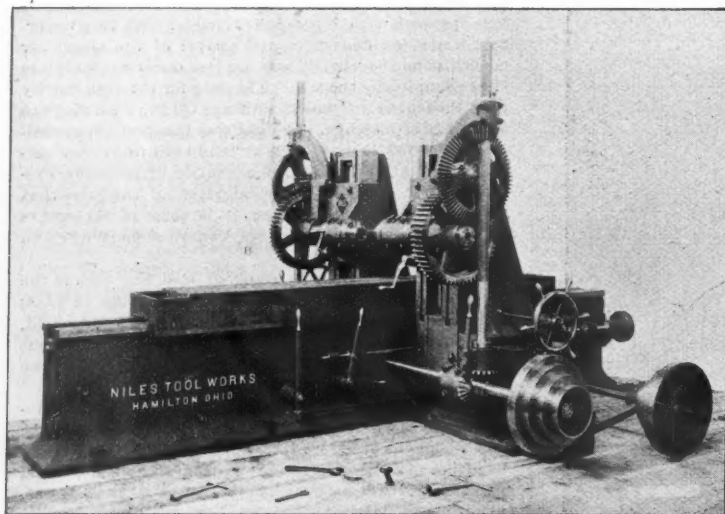
#### Seven Years an Assistant Brakeman.

Among the stories current in German newspapers, especially socialist journals, in these days of railroad accidents and criticism of railroad managers, is this:

It is well once in a while to consider the state as an employer and to remind it of its duties to society. Monday we addressed the conductor of our train as "Mr. Conductor." He answered that he was not a conductor yet. "Well then, Mr. Brakeman," we said. "Not even that," he answered. "I have been assistant brakeman for seven years, but have to do a conductor's work." "What do you get a month?" "Sixty marks [\$14.40]." "Rather small wages for a married man who has already served the State three years as a soldier." "Yes, indeed, the danger in which we live constantly is not properly paid for." "Why have you been assistant brakeman so long; why don't they promote you to con-

#### The Siberian Railroad.

A traveler who has recently passed over the completed portion of the Siberian Railroad writes to a Cologne newspaper that with the help of this railroad an ordinary passenger can go from St. Petersburg to Lake Baikal in 18 to 20 days while, in the good old times, when there was no railroad further east than Moscow, a governor-general once made the journey in 15 days; and experienced traveling merchants made it in 28 to 30 days. It is true that a considerable part of the Siberian Railroad was not formally open for traffic when this writer passed over it, but on that part of it east of the Obi, which is so open, the trains take 72 hours for the run, 20 hours of which are absorbed by the stops at stations.



A Horizontal, Duplex Milling Machine Built by the Niles Tool Works.

the same being 16 per cent. of investment. The directors expected that the road for the following year "would pay expenses and earn 50 per cent., or nearly so, of cost." How far such expectation of profits was justified, is best shown by results, and especially by the fact that in January, 1848, the property, capital stock included, was sold at public sale, under decree of court, to satisfy judgment \$103,599. In this connection it is necessary only to say, that this road ere long became part of the Southern Michigan Railroad, extending west to Chicago, which now constitutes part of the Lake Shore & Michigan Southern.

As indicating something of the experience and liabilities of pioneer railway travel, may here be given the case of a track repairer of the Erie and Kalamazoo road, in December, 1841. After riding a short distance, he changed his seat, and very soon thereafter was startled by the sudden appearance of the end of a loose rail (known as "snake-head") thrust up from the track through the very seat which he had just vacated, the bar striking him under the chin and pushing him backward with much force, though without serious injury. This train left Adrian at 7:30 p. m., and ere long finding itself without fuel or water, it became necessary to supply the one by gathering sticks in the forest, and the other by dipping water by pails from ditches beside the track. The same process again becoming necessary, the passengers concluded it would be easier to complete the trip on foot, than to "work their passage" in that way; and they reached Toledo at 2:30 a. m., in advance of the train, averaging about five miles an hour from Adrian.

It may here be stated that at the time of the opening of the Cleveland and Toledo (1853) several other roads were in operation in Ohio, whose aggregate length was 1,272 miles. The amounts at preceding dates were as follows: 1836, 11 miles; 1841, 36 miles; 1846, 84 miles; 1851, 572 miles.

#### Horizontal Duplex Milling Machine.

The engravings represent a new horizontal duplex milling machine, built for extra heavy work. The bed of this machine has two wings upon which the uprights are seated. The uprights may be adjusted laterally without disturbing their alignment. As the wings are cast solid with the bed, the adjustment of the uprights does not affect their rigidity, while still providing for a wide range of work. The spindles are large and hollow, and run in bronze bushings. Provision is made for taking up end thrust and wear. The spindle heads present large square surfaces to the uprights and are, as is also the table, square gibbed. The uprights and bed are heavy, well proportioned and heavily ribbed. The shafts and gears are of good size, the gears being cut out of the solid. The table has power feed and power quick return. All handles for controlling the machine are placed within reach of the operator, thus enabling him to watch his work while using the handles to throw in or reverse the feeds or to stop or start the spindles. The lubricant used for cutting is collected in troughs and lead to a reservoir in the bed.

The machine is built by the Niles Tool Works Co., Hamilton, O.

ductor when you have been doing conductor's work so long? Have you given reason for finding fault with you?" "Oh, no," he replied, "there are assistant brakemen who have served longer than I have. But, you know, when we become conductors they have to pay us 85 marks [\$20.40] a month, and the longer they can keep a man at 60 marks the better they like it." As he noticed our searching glance at his extremely threadbare uniform he said: "On 60 marks a month we have to furnish our own uniforms: the post-office employees don't have to do that." Why do we write this? On the one hand, to show that the little fee which the traveling public only too seldom gives the conductor is no superfluity; on the other, because it seems very strange to us that the state, which is constantly making laws to compel other employers to treat their men humanely pays so poorly its own employees of the lower grades.

The railroad journal in which we find this quoted shows that either the brakeman or the reporter lied in certain of the above statements. An assistant brakeman gets 80 to 90 marks (\$19.20 to \$21.60) a month, and not 60

On the part of the road east of the Obi, which is officially called the "Central Siberian Railroad," this traveler reports a sad condition of things. The cars, which are excellent, are occupied chiefly by men traveling on passes, who belong to a low class. The walls are filthy, the mirrors and window panes scratched, and even the outer side of the cars scribbled over. On arriving at a certain station the conductor, after calling out its name, adds in a loud voice: "Look out! This is a terrible place for stealing." At this place, and for 50 miles further, there is no water. Here there was a wait of 17 hours before the train started for Tomsk. Where the bridge over the Yenisei stands the ice piles up in floods 20 ft. high, and the bridge is made to resist it. Thence east there is a train only three times a week. To Karsk, before the railroad, the journey was made by post in 24 hours, and in winter in 22. The train takes 18 hours.

This part of the road, it must be remembered, is in

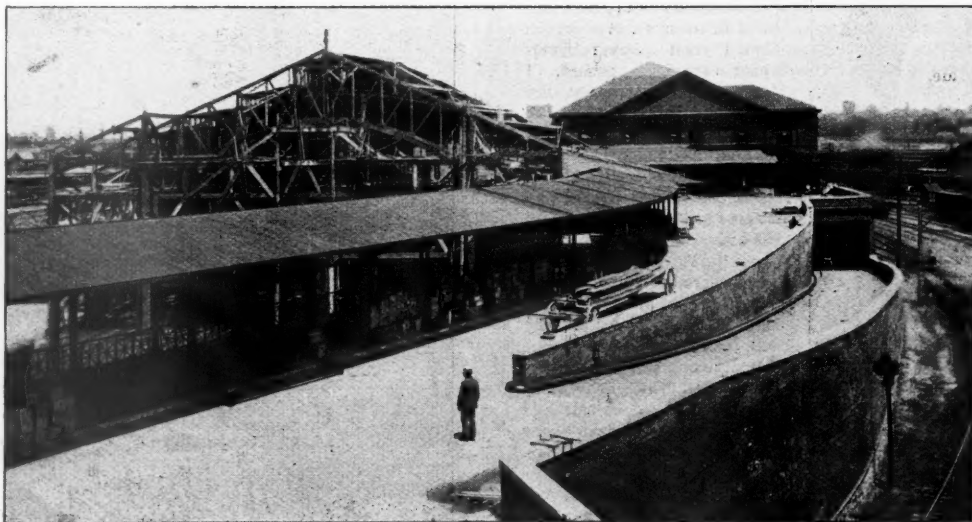


Fig. 2.—Carriage-ways and Foot-walk Leading from High Street to the Union Passenger Station, Columbus, Ohio.

marks; he is never employed continuously as conductor, and he is not required to wear a uniform. Promotion may be very slow from the ranks of assistant brakemen, but this is because the law requires that preference shall be given for the places of full brakeman and conductor to non-commissioned officers of the army discharged after several years' service in addition to the three years required of everybody. It has been found very difficult to retain these non-commissioned officers, and their retention is considered of vital importance to the efficiency of the army. But stripped of all its exaggerations, this picture of a German sub-brakeman will hardly seem tempting to an American railroad man.

the condition in which many of our long lines have been while still "in contractors' hands," trains being run primarily for the purpose of extending the road, and passengers admitted only on sufferance, as it were.

#### Columbus Union Passenger Station.

The new Union passenger station at Columbus, O., was described in the *Railroad Gazette* of April 30 last, drawings being given of the first and second floor plans of the building, of the plan of the tracks in the trainshed, end elevations of the roof truss, of the trainshed and of some details of the trusses and bracing. We now

give some outside and inside views made from photographs recently taken.

This station was designed by D. H. Burnham & Co., of Chicago. The trainshed is the old one, which has been extended 75 ft. westward and has been improved by the addition of ornamental screens of copper and

those who have passed examinations with credit at the training school, and others announce that they will do so hereafter.

For 10 years past Hungary has had a special school for the instruction of railroad employees, which is managed

India, through the Suez Canal and the Hellespont to Odessa. That this traffic will be diverted by the Siberian Railroad is a common supposition; but the Austrian Consul at Odessa says no, because the freight rate by rail on manufactured goods from Odessa to the western terminus of the Siberian Railroad is 87 cents per pood (36 lbs.), while by sea it is only 18 to 20 cents for the whole distance to Vladivostok, the Pacific terminus of the Siberian Railroad. Those who count on a revolution in traffic by this road should reflect a moment on the cost at the very lowest rates of carrying freight 6,000 miles by rail.

The Hungarian State Railroad stations have in the past been provided with large bells, 676 in all, with which the starting of trains, etc., was notified. Last June this use of these bells was abolished, and the Minister of Trade, who is in charge of these railroads, directs that the bells which are no longer needed may be sold at moderate prices, in the first place to churches or schools, secondly to volunteer fire companies and similar societies, and finally to industrial or other establishments. Under certain circumstances, or when poverty is shown, the price of the bell may be reduced to what it would sell for as old metal.

By a new parcels tariff in France, packages whose greatest dimension does not exceed 5 ft., and weighing from 11 to 22 lbs., will be carried from any station of the State Railroad to any other station in France for 1.25 francs (24 cents) when delivered at the consignee's station, and for 29 cents when delivered at his domicile. No more than 40 francs will be paid for the loss or damage of such a parcel unless the shipper insures it, which he may do up to 500 francs for a charge of 12 or 17 cents, according as the delivery is at the station or the domicile.

Twenty years ago and more we heard much of the "Fairlie locomotive," which the late Mr. Robert Fairlie urged as indispensable to economy, on narrow-gauge railroads especially, and some of which were used on the steep grades of the Mexican Railway and elsewhere. In Russia, where they were introduced with the first narrow-gauge railroads, they seem to have maintained themselves. Late government reports show that while there were 46 Fairlie locomotives in use in Russia in 1885, in 1893 there were 51, and in 1894, 74.

American travelers who go to Europe by the Mediterranean, as many do in winter since the German steamers have been running to Gibraltar, Algiers, Naples and Genoa, will be interested in learning that the express train which heretofore has had a sleeping car from Paris to Madrid and Seville, this fall has one once a week to and from Gibraltar. It will leave Gibraltar (or rather the Spanish town Algeciras, across the bay from Gibraltar) Wednesdays at 6:35 p. m., and arrive in Paris at 8:15 p. m. Friday.

The Austrian "rail pool," which was about to expire, is said to have been renewed for a term of five years, till the end of 1902. There are six mills in the pool, one of them belonging to the Southern Railroad. Their aggregate production last year was 67,000 tons, besides what the Southern road rolled for its own use.

About Oct. 1 another considerable section of the Sibe-



Fig. 1.—High-Street Entrance to Union Passenger Station, Columbus, Ohio.

iron in the gables at both ends. The station proper, at the south side of the trainshed, has a basement at the level of the tracks; a main floor above this, with a bridge 50 ft. wide extending out across all the tracks in the trainshed, with stairways leading down, both right and left, to platforms between each pair of tracks; and a third story containing offices. The peculiarity of the station, as shown in the plan drawing, is the arcade entrance, built on the viaduct which carries High street across the tracks west of the station. This viaduct is 800 ft. long and is lined on the side toward the station with a long row of small two-story buildings designed to be used for stores. These buildings hide from the street the view of trains standing in the station. The row is broken in the center by an ornamental structure of arches and columns, faced with terra-cotta, called the arcade, which forms the main entrance from the street to the station. One end of the arcade is shown in Fig. 1. Passing through this entrance carriages may proceed along a level way to the carriage stand, on a level with the main floor of the station, or down an incline to the basement, which is on a level with the tracks. The roadways to the two levels are shown in Fig. 2, which is a view looking eastward from the viaduct. From the arcade to the station is a distance of about 300 ft.

Fig. 3 shows an interior view of the station, taken in the main waiting-room looking east.

#### Foreign Railroad Notes.

The Vienna "Training School for Railroad Employees" has just begun its sixtieth year. Unlike the Budapest school this does not prepare men for appointments, but is open only to men already in railroad service who wish to increase their special knowledge and qualify themselves for promotion. The Vienna school has two annual courses, the lower including railroad technology, traffic geography, description of goods transported, and book-keeping; the higher railroad law, political economy, traffic statistics, custom-house regulations, rates, and electro-technology. The expenses of the school, which are small, are borne by the several railroad managements interested in proportion to the length of their lines. The management and supervision and the appointment of teachers are exercised by a committee of five, three appointed by the conference of Austrian railroad directors and two by the Austrian Railroad Club. There are two classes of students, regular and extraordinary. The latter are limited only by the seating capacity of the rooms where instruction is given. They choose their branches of instruction at will and are not bound to submit to any examination at the close of the course. The number of students has increased from year to year and last year there were 141. One of the leading Austrian roads has, in promoting men, preferred

by the government in association with the railroad administrations. The school is intended primarily to fit men for station, telegraph and commercial service. In these 10 years it has turned out about 1,800 men. The students have first 10 months instruction in the school at Budapest and then three months service on a railroad, the latter being an indispensable part of the course. The subjects taught are railroad construction and equipment, geography, history of the development of railroads, railroad law, railroad arithmetic and book-keeping, an account of materials and goods, and railroad sanitation. Only practical railroad men are permitted

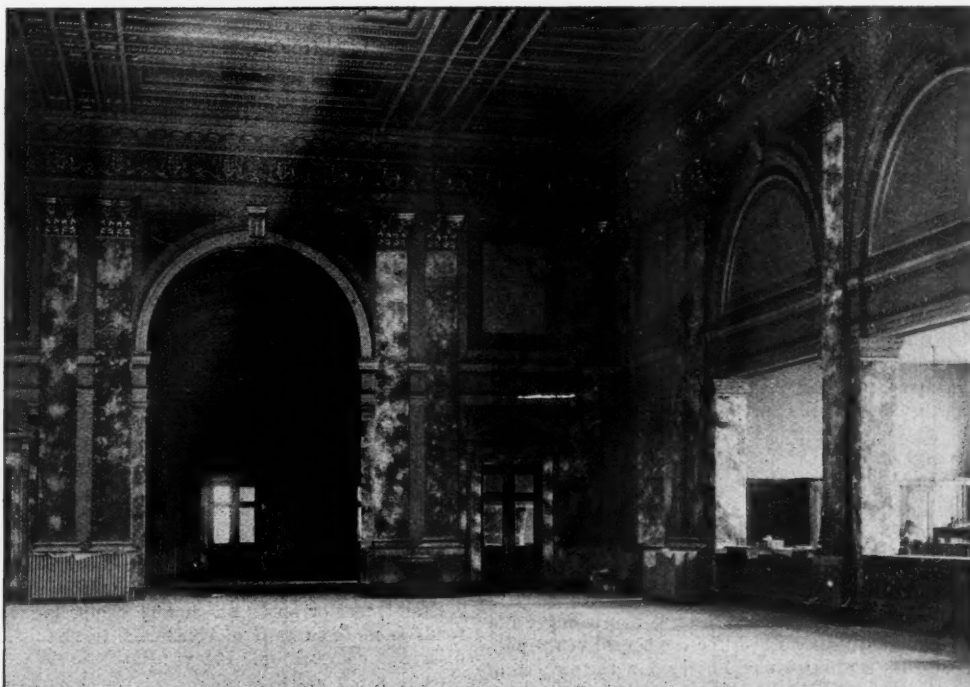


Fig. 3.—View in Main Hall, Columbus Union Passenger Station.

to serve as teachers. Substantially all of the graduates enter railroad service immediately in the lowest grades, and the school is considered to have been of great value to the railroads.

What little traffic there is between eastern Siberia and western Russia has heretofore gone by sea around

rian Railroad was to be opened to the public, extending as far east as the Yenisei River, on which section are some cattle-growing districts.

The Paris, Lyons & Mediterranean Railroad at several of its larger stations delivers notices of the arrival of freight by youths mounted on bicycles.



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#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The accident on the Chesapeake & Ohio Railroad not far from Charlottesville on the afternoon of Nov 4 was one of a kind that everybody who knows much about such matters is always in dread of. The train was running fast around a curve and an axle broke. The astonishing thing is that these accidents do not happen oftener, and yet what can we do about it? It is impossible to avoid curves, and it is equally impossible to keep from running fast around curves. Both are inevitable to the situation and we never shall escape these conditions. On the other hand, the strain on machinery, and especially on the axles, is immense. In this case the axle that was broken was on the forward truck of the locomotive. It broke inside, close to the hub. This axle had been in service a little more than a year and the journal was worn but  $\frac{1}{8}$  in. When we consider the strain brought on this axle by the pressure of the wheel flange against the rail, multiplied by the lever arm of the radius of the wheel, and consider that this strain is reversed every time the wheel turns round, it is a wonder that any axle stands it. So far as we can judge the only thing that it is humanly possible to do is to take every known precaution to get good axles, and we have no doubt that the Chesapeake & Ohio people have taken all of these precautions. In the seven years up to July 1 the company had run 54 million train-miles with the loss of but one passenger—certainly a grand record.

A railroad pool, whether of traffic or of traffic earnings, may be described as a device for preventing the consolidation of rival railroad companies, and, therefore, as an effective check against the establishment of powerful monopolies; but legislators and others who take superficial views of the relations of railroads to the public will not believe this, and so, as remarked by the New York Evening Post, detailed elementary explanations like that delivered by Mr. Blanchard before the New York Board of Trade and Transportation last week must be repeated over and over before we can expect to have rational action on the matter in Congress or in any non-railroad body. Strange as it may seem to the stranger or to the politician, American railroad managers, in favoring pools, have always done so because in that way they were doing their best to preserve their independence of rival companies. In so far as they succeeded they preserved, each for himself, the liberty to compete in facilities—comfort and frequency in passenger service and speed in both passenger and freight—and thus worked for the benefit of the public. They sacrificed one liberty for the purpose of saving the other. Liberty to compete in facilities is one of the chief channels in which the enterprising railroad officer can show his abilities, and it is as natural for him to try to keep this channel free as it is to desire to earn a living. Regulations and restrictions are as necessary in railroad competition as in a horse race or a game of cards, a debate in Congress or any other performance where men with conflicting motives must act in the same field. Without them

no useful result can be accomplished. But the regulation of rate-making is such an enormously difficult task that in every extended territory everybody has had to retire from the field baffled. It can't be done. Pooling is simply a partially satisfactory substitute for this more rational remedy, which is much desired but is unattainable. It is natural enough for Congressmen to think, when rival railroads go one step toward agreement, that they can and will go the whole figure; will become so friendly as to consolidate; but any honest railroad manager will show them from his experience that this view is illogical, howsoever natural it may be. Wherever this has not been true; where consolidation has actually been preferred to the continuation of independent existence, with pools as aids to rational competition, it has been because pools could not be enforced. In consequence of the unfavorable attitude of the courts and the crude or unprincipled character of some railroad managements, half-way regulation of rivalry, like that effected by a pool, was in many cases as hard to maintain before the passage of the Interstate Commerce law as it has been since.

We have called pooling a half-way measure of regulation. Such a characterization is justified because it does not always remove all of the motives for secret rate-cutting, and because pools have to be revised now and then, and a revision always gives occasion for a good deal of strife which is very much like the sort of strife that we see where pools are never thought of. Nevertheless, as we have often said, pools, even as half-way measures, are well worth having. Many of those who oppose pools seem to think that in so doing they are helping in the good work of administering deserved punishment to evil-disposed freight managers and agents; and the consciousness of serving Justice in that way always seems to fill the human heart with a great complacency. But the inability of railroads to make their competition orderly is far less due to wickedness of heart than to the magnitude of the problem. The magnitude of the problem is due to the great length of our railroad lines, the multiplicity of competing cities, each related to any given one in a way different in some degree from all the others, and the complex relations of different commodities, which, for instance, compel the carrier of wheat to New York to take into consideration the rates on corn to Galveston. With ideal conditions, each local freight agent would have telephone connection with a hundred or a thousand other local agents, some of them thousands of miles away; a hundred pairs of ears so as to be able to use these telephones at the right time, and the fabulous mathematical powers requisite to estimate instantly the effect on his own business of any rise or fall in rates at rival offices. Only by establishing these impossible conditions can freight competition be always moderate, not to say orderly. Feeling the lack of them, the agent reduces a rate a dollar a ton when he ought to reduce it only ten cents; and this difference produces the fatal trouble, nine times out of ten. Perhaps the best illustration of what freight agents would like to do if they could is to be found in the stock and commercial exchanges of the world, London, New York, Berlin, Paris, Chicago. Buyers or sellers competing in any one of these markets can keep constantly in touch with prices in all of them. Ostensibly they have the ideal condition that we have just mentioned; though, as every one knows, they keep business going only by depending constantly, in some degree at least, on guess work. (We speak now of legitimate dealers, not mere speculators.) With these costly facilities brokers in stocks, grain and cotton can keep their competition within something like reasonable bounds. If one can imagine how a broker would get along if it took him ten hours instead of ten minutes to ascertain what his competitors were doing, it will then be possible to form some idea of the difficulties which freight agents have to contend with in trying to get shipments away from competing roads.

The Evening Post, in the article to which we have referred, reminds its readers that the present restraint, real or apparent, among competing railroads is no assurance of continued freedom from disastrous competition. It says:

Pools being declared illegal, the railroads formed agreements among themselves, not for the division of earnings, but for the stability of rates, and these agreements were themselves next pronounced illegal, in the Trans-Missouri Association case, by the Supreme Court, upon a literal interpretation of the anti-trust act of 1890, which the majority of the Supreme Court took to be based upon the old and outworn policy of unrestricted competition. The railroads are, therefore, left in a sort of limbo, in which they are told that they cannot combine and must compete, though it is as well established as anything can be that unrestricted competition must mean, sooner or later,

a renewal of the old railway wars and the absorption of one line by another. Just now this fate is averted partly because the Supreme Court is thought not to have finally decided the matter, and partly because railway earnings are increasing, so that for the time being there is no temptation to cut rates. But this is purely a piece of good luck. Unless the law will countenance agreements which protect the weaker lines, the future must have in store for us railroad wars which will be as much fiercer and more serious in their effect than the old conflicts as the stake fought for will be greater. We may fairly, therefore, regard the permission to pool as something much more important than a mere act of justice to the railroads. It is the only means by which the process of combination and consolidation, which anti-monopolists at Washington profess to dread so much, can be in any way controlled or limited.

The only condition tending to modify this view is the possibility that new competing railroads may not be built, and that after a time the country will grow so that the principal railroads will be able to keep themselves in potatoes and salt on their earnings from non-competitive business, and thus avoid total starvation. But even so, the continuance of less-than-cost rates for transporting competitive freight is an injustice to shippers of other freight, and the restriction of new railroad building is about the last thing that any legislature can be expected to favor.

#### The Coming of the Steel Car.

As we take up the annual reports of the railroads, especially within the last two or three years, we are struck by the increase of the freight trainload. It is a commonplace now that engine weights and car capacity have been steadily crowded up; a result is seen in the greater average trainload. It is quite obvious that railroad managers understand the necessity of reducing cost of carrying and that they are fully aware that on most roads the quickest and most easily available way of reducing cost is by increasing the average load. This of course implies having a traffic that can be massed in heavy trains and that does not need to be dispatched at frequent intervals and for many different destinations. In the United States most railroads have a considerable proportion of that kind of freight. The maximum benefit of heavy trains will be had where the greatest percentage of the traffic is of that sort, as for instance in carrying coal and ore between Pittsburgh and the lake ports, and it is natural that the most important advance in size of rolling stock should be made in that region. So we find the Schoen Company building for the Pittsburgh, Bessemer & Lake Erie 600 steel cars of 100,000 lbs. capacity, and the Pittsburgh & Lake Erie ordering 50 such cars, and the Pennsylvania Railroad preparing plans for cars to carry 110,000 lbs. of coal or ore and for locomotives to haul them.

Naturally, too, the present development of very capacious cars is in steel, because, for several reasons, steel cars can be made lighter than wooden cars of the same capacity, particularly when that capacity is great. More paying load can be hauled in a train of the same gross weight. Very capacious steel cars can be built for approximately the same cost per ton of carrying capacity as wooden cars. To handle a given amount of traffic fewer cars would be required, and, for a given load, the train would be shorter. In these two facts are practical advantages which all railroad men will recognize. Less track and yard room would be required, fewer men to handle and care for the rolling stock, and other advantages, of short as compared with long trains on the road, are sufficiently obvious. Furthermore, the metal cars would be safer from destruction by fire. Beyond this, it is probably true that steel cars can be so built as to reduce very greatly the maintenance account and increase in equal degree the life of the rolling stock even up to a life of 50 years under normal conditions. This statement, however, we are not yet quite ready to make without qualification. In general it is probably true; but for some reasons we are cautious about committing ourselves unqualifiedly about this. This side of the question we submit to the designers, builders and users of steel cars for more complete discussion.

A little analysis of comparative train weights shows some significant facts. If we assume a train of 30 steel cars with a capacity of 100,000 lbs. each, it will carry 1,500 tons of paying freight and the dead weight of the cars will be 510 tons, or a total of 2,010 tons. A train of the same gross weight, of the best standard 60,000-lb. capacity cars, would be made up of two-thirds paying load and one-third weight of cars; that is, the cars hauled would weigh 708 tons, or 193 tons more than the car weight in the steel-car train. This item alone is more than the average trainload of paying freight, counting all train mileage, on many respectable railroads. The average, for instance, on seven important representative roads from the latest official figures is 257 tons, which is considerably higher than the average of the roads of the country.

In this example the saving in train length would be more than 500 feet, which is a very important consideration from the operating standpoint. The saving in weight only indicates a part of the saving in the cost of hauling. Increasing the number of cars in the train adds to journal friction and rolling friction and to all wearing and breakable parts. It increases the resistance on tangents and to a still greater degree, on curves.

Considering these facts there is ample reason why those railroads which are blessed with a heavy and steady tonnage should be looking seriously into this matter of greatly increasing the carrying capacity of cars by the use of steel.

#### Annual Reports.

**Southern Pacific Co.**—In April last the company issued what was called an abridged report, a document of some 58 folio pages covering the operations of the year ending Dec. 31, 1896. The calendar year was the old fiscal year, but the company has now changed its fiscal year to coincide with that of the Interstate Commerce Commission which ends June 30, so that the one set of figures may be available for the stockholders' report and that to the Commission. We now have the results of operations for the June 30 year contained in some 112 folio pages.

The railroad mileage of the company has now reached a total of 7,376, the chief addition during the year having been 57 miles, of extensions of the Coast Division in California. The gross traffic receipts from the rail lines were \$46,578,034 and from the steamship lines \$2,293,867, a total of \$48,871,901. Operating expenses were \$31,675,941 and the net earnings were \$17,195,959. The miscellaneous income, of which the largest portion, \$1,185,303, was from trackage and rentals, raised this figure to \$19,533,619. Out of this came \$12,208,481 for bonded debt interest, \$1,567,188 for taxes, and other charges to the total amount of \$17,260,581. The total surplus, then, was \$2,273,038. The leased lines taken separately show a deficit of \$415,224.

Out of the surplus was deducted \$922,798 for extraordinary betterments and additions, leaving the net surplus as \$1,350,240. As compared with the year ending June 30, 1896, gross earnings decreased \$715,168, or 1.44 per cent., but operating expenses decreased \$1,042,181, or 3.18 per cent., so that net traffic earnings increased some \$327,013, or equal to 1.94 per cent. The decreases in gross earnings and savings in working charges have been noticeable features of the Southern Pacific's operations of recent years. The following table, showing earnings and expenses for years ending June 30 for the last five years, bears on this point:

Years.	Average miles.	Gross earnings.	Operating expenses.	Earnings over operating expenses.
1897.....	7,371	\$46,578,034	\$31,675,941	\$14,902,093
1896.....	7,369	46,578,034	32,718,122	13,860,912
1895.....	7,276	49,971,042	32,510,029	17,461,013
1894.....	7,213	49,327,623	31,717,469	17,610,154
1893.....	7,175	51,376,729	34,815,527	16,561,202

The gross receipts have fallen off \$5,485,000, expenses have been cut down \$3,140,000, and the loss in net receipts is \$2,345,000. The loss in income is not due to a less tonnage, which in 1897 was greater than in any previous year, but to the lower rate. The ton-mile rate in 1893 was 1.505 cents, and in 1897 was 1.126 cents, a loss of 25 per cent., whereas the ton miles per mile of road were in 1897, 351,836 miles, against 299,929—an increase of 17.31 per cent. The average passenger rate received in 1893 was 2.493 cents per passenger mile, against 2.323 cents in 1897—a decrease of .170 cents or 6.82 per cent., but the density of travel decreased from 71,650 passenger miles per mile of road operated in 1893 to 63,290 passenger miles in 1897—a decrease of 11.53 per cent.

The larger part of the loss was due to a falling off in passenger travel. These receipts fell off \$365,450 or 3.1 per cent., while the loss in freight earnings was less than six-tenths of one per cent., while through and local passenger mileage decreased 21 millions or 4.7 per cent.; ferry-suburban passenger miles increased 19 millions or 17.7 per cent.

Combined figures are not given for the entire system, but the following table gives traffic statistics for the Pacific and Atlantic systems:

	Pacific System.		Atlantic Properties.	
		P. C. of Inc. or Dec.		P. C. of Inc. or Dec.
Total passenger train mileage.....	8,031,947	D. .70	1,833,865	D. 4.01
Mileage of all cars in passenger trains.....	43,240,375	D. .63	10,545,289	D. 3.37
Number of passengers carried.....	19,151,558	D. .47	1,019,917	I. 9.77
Passengers carried one mile.....	435,207,200	D. 3.71	73,721,882	I. 2.87
Average number of passengers per train.....	147.74	D. 4.80	42.46	I. 7.17
Total freight train mileage.....	8,892,664	D. 7.62	4,715,534	D. 1.98
Mileage of cars in freight trains.....	153,282,599	D. 7.36	92,361,401	D. 3.27
Tons commercial and company freight.....	6,659,532	I. .09	3,266,995	I. .13
Ton-miles commercial and company freight.....	1,671,798,817	D. .02	995,238,450	D. .07
Average tons per train.....	238.84	.....	211.45	I. 2.29

\* Includes 13,492,901 passengers carried by ferry-suburban trains. † Excluding ferry-suburban.

It will be noticed that while the tonnage carried was slightly in excess of last year on both systems, the freight train mileage on the Pacific lines was 733,682 miles, or 7.6 per cent. less, and on the Atlantic lines 96,000 miles, or about 2 per cent. less. The saving in car mileage was also important—12,179,000 miles, or 7.36 per cent., on the Pacific lines, and 2,144,000 miles, or .69 per cent., on the Atlantic lines. This, of course, had a very direct bearing on expenses. In fact, the cost of handling traffic was \$450,869 less on the Pacific lines than in 1896. On the Atlantic lines this item was \$27,511 higher.

**Great Northern.**—The report of the Great Northern Railway Company for the year ending June 30 is received. The main results for the railroad system which covers the lines leased from the Manitoba, the Eastern of Minnesota, the Montana Central, the Wilmar & Sioux Falls and the Duluth, Watertown & Pacific, are as below. This does not include sundry enterprises earning about \$2,000,000 gross.

	1897.	1896.
Gross earnings.....	\$19,130,060	\$19,612,561
Operating expenses.....	10,701,871	10,239,708
Net earnings.....	\$8,774,189	\$9,381,856
Taxes.....	602,649	632,837
Net income.....	\$8,131,540	\$8,749,019
Operating expenses, per cent. of gross.....	55.06	52.16
Operating expenses and taxes, per cent. of gross.....	58.16	55.59
Gross per mile of road.....	\$1,102	\$1,484
Operating expenses per mile of road.....	2,424	2,339
Net earnings per mile of road.....	\$1,978	\$2,145
Average miles worked.....	4,415	4,374

The guaranteed dividends (six per cent.) on the stock of the old Manitoba, and guaranteed interest on the bonds of the same were paid, and then five per cent. (\$1,250,000) was paid on the Great Northern stock.

Freight earnings gained a trifle over last year, but passenger earnings lost \$121,000, and there were losses in gross in the items of mail, express and miscellaneous, and with the increase in expenses the loss in net was \$648,000. The greatest tonnage loss was in wheat, viz., 600,000 tons, but the total tons lost amounted to only 50,000. Even with a loss in tons there was a gain in ton-miles of over 34,000,000, "almost entirely in business of the lines from Minot to the Pacific Coast." The ton-mile rate fell from 0.976 cent to 0.956, or about two per cent., or about \$331,500 in total revenue. This rate is astonishingly low for a far-western railroad. Unfortunately the statistics of the report are so few that we cannot get any notion of the relative quantities, or rates, or localities of the different items of tonnage. Furthermore the expense account is not given in enough detail to permit of any useful comparisons. We discover, however, that the operating economy in train movement is still continued. The average load has again increased, this time from 256.2 tons to 281.1 tons or 9.7 per cent. The earnings per freight-train-mile increased from \$2.55 to \$2.73, or 7.06 per cent. While the revenue ton-miles increased 2.12 per cent. the loaded car-miles decreased 2.81 per cent. and the empty car-miles 16.42 per cent. Very considerable sums spent on maintenance and betterments are still charged to operating expenses, for example the cost of replacements and renewals, and of improvements of structures and banks, charged to maintenance of track, amounted to about 10 cents per mile on all revenue trains during the year.

The President is hopeful of a prosperous year ahead and estimates that over 20,000 new settlers established themselves along the company's lines last year.

The "Interchangeable Mileage Credit System" was announced to be put in use on the Western Passenger Association lines in Illinois, Iowa, Wisconsin, Minnesota and some contiguous territory on Nov. 10; and the commercial travelers in that region ought now to be happy, for they can ride at two cents a mile with no large advance expenditure of money, the mileage book being superseded by a simple "credential," good on all the roads, which authorizes local ticket agents to issue credit checks with ordinary single-trip tickets. After having bought tickets aggregating 2,000 miles and costing, say, \$60, the passenger passes in his credit checks to a local agent who sends them to the mileage bureau at Chicago, and the bureau sends the passenger a rebate of \$20. The "credential" is a copy of the contract, unsigned, pasted into a leather pocketbook, and the passenger must pay 50 cents for it. It is good for a year. The pocketbook is for holding the credit checks. One-half of each check has to be signed and given up to the conductor. In principle this credit system is very simple, but where the local rates are three cents a mile, or higher, the passenger has to pay out \$20 more than the net value of his rides before he gets his rebate, instead of only \$10 as in the case of a \$50 ticket with a \$10 rebate. This last-named form is still on sale, as also the 1,000-mile ticket at \$25 with no rebate. The ticket agents and conductors must begin to wonder whether a job in the engineer's office computing bridge strains would not be preferable to their present work, which grows more complicated with each change in ticket arrangements. Every credit slip delivered to a passenger presenting a "credential" has to be filled out in duplicate by means of carbon paper, and the conductors as well as the agents have to carry a stock of slips, so that passengers from stations where no tickets are sold shall not be deprived of their precious privilege.

The most noticeable thing about the continual mile-

age ticket agitation in the west is the constant succession of new and "improved" tickets. These are literally too numerous to mention, unless one has time to burn. The tickets are limited but the words in the contract are unlimited, and one must read through them before he can tell for certain whether the ticket in hand differs from Smith's or Brown's, except in some little detail which serves chiefly as a basis for a patent claim. The latest candidate for favor is the "Carroll ticket," which we find described in a Columbus (Ohio) paper. This, we are told,

"Has many advantages over the ticket now in use and will most likely be selected as the standard ticket by the Central Passenger Association. The mileage of this ticket is in duplex form and a passenger can sign his name on the mileage at his leisure. He then presents it to a ticket agent and states his destination. The ticket agent tears the required mileage from the upper half of the mileage strip, gives the portion remaining in the book an impression of his date and stamps with a rubber stamp the destination of the passenger. He then returns the book to the owner.

"The conductor of the train lifts the uncovered portion of the mileage strip, which must necessarily be of the same number of miles as that detached by the ticket agent, the mileage being in duplex form, and the passenger signs on the back in the presence of the conductor.

"The great advantage of this ticket over the present form is that agents are not required to carry a stock of exchange tickets and it obviates the possibility of error in transcribing the number of the mileage book to the exchange ticket. The time involved in validating the Carroll mileage strip should not be greater than that involved in the issuance of an ordinary card ticket. While the Carroll ticket is regarded as the best form of the two, the champions of the Fort ticket are making a strong fight for its adoption, a fact explained by the royalties which accrue to the patentee of the ticket in use."

When it is considered that most of this tedious red-tape is required for no other purpose than that of thwarting the schemes of conductors and commercial travelers who are inclined to combine to make ten miles of coupons answer for a hundred-mile ride, it is not surprising that some people assert that railroad business is conducted in a very unbusiness-like way.

The interchangeable mileage ticket of the Central Passenger Association has now been in use over two months, and its sponsors appear to feel very much encouraged. The requirement that tickets must not be used for trips over two or more roads has been modified where necessary, thus removing one of the chief obstacles to their success, and the Chicago, Indianapolis & Louisville has agreed to come into the agreement, all the roads from Chicago to Cincinnati and Louisville having consented to one uniform time for through passenger trains. The drummers have complained at the time lost in getting exchange tickets at junctions, where mileage-ticket holders by the dozen often appear at the counter all at once, but they seem to have subsided. Whatever the complaints, or whatever the means used to meet them, the main object that was had in view when the ticket was adopted, that of throwing the scalper out of business, seems to have been at least partially successful, for we read that in Columbus two or three brokers out of the five in the city have gone out of business, and similar reports come from Indianapolis and Cincinnati. Modifications in the regulations for the use of the ticket are, we believe, still under consideration.

A week or two since the grain men of Kansas City were complaining of the Burlington road for refusing to furnish cars to the farmers to ship grain to Kansas City, while shippers wishing to send to Chicago or St. Louis got all the cars they asked for. The grievance was made the subject of an editorial in one of the newspapers of the city, and the Burlington people appeared to be a very bad lot. Cars were furnished, and in about three days the yards were so badly blocked at Kansas City that orders to stop sending grain there had to be again sent out. As the inability of the Belt Line to promptly dispose of the cars, added to the crowded condition of the elevators themselves, was an obstacle which operated whenever car-shortage did not, it looks as though the complaints must have arisen chiefly from a desire to make a noise. Moreover, merchants at Chicago and St. Louis say that the railroad company has notified them (or their shippers) of loading restrictions similar to those that were complained of at Kansas City, so that it does not look much as though any injustice had been done, except, perhaps, as minor injustices are always perpetrated, unwittingly, when the shortage of cars is severe. But howsoever unpopular the Burlington might make itself by discriminating between Kansas City shipments and those for Chicago, it is worth while to remember that it might have a good deal of justification for doing just that thing. Such unpopularity would be likely to damage the road very greatly afterward, and as long as the farmers remembered it, and any manager would therefore hesitate long before giving the order incurring it; but yet the Burlington manager may have been so situated in this very case that he would do the greatest good to the greatest number by diverting cars as alleged; for a car going to Chicago may have been sure of a return load when one going to Kansas City was not. Prompt movement of these westbound loads may have been as great a benefit to the grain shippers as the prompt movement of their corn or wheat; and in any event the car would be serving for two shipments, where in the alternative case it would, or might, serve only one.

## NEW PUBLICATIONS.

**Railway Track and Track Work.** By E. E. Russell Tratman, Associate Editor of *Engineering News*. Octavo, 418 pages and index, with over 200 illustrations. New York: The Engineering News Publishing Co., 1897. Price, \$3.

Various papers prepared for scientific societies and for the United States Forestry Division have made the author of this book known as an industrious gatherer of facts about railroad track. He has spread his nets over the world and has heaped their unclassified contents before us. In the mass we have sometimes been able to find something useful and occasionally something interesting. When this book appeared, knowing the long preparation for it and the industry of the author, and taking for granted an increasing experience and a growing maturity of judgment, we had hoped to find not only that important information had been gathered, but that it had been pulled together and organized. This hope has been disappointed. We find the same old appetite for facts and the same incapacity to digest them, and the appetite is as indiscriminating as ever. The important and the unimportant are piled together with no effort to "weight" the several pieces of information which the author has been able to collect. If a railroad 250 miles long paints a signboard brown, that fact is just as important apparently as if a railroad 7,000 miles long uses tie-pates instead of rail braces on all curves. Opening the book at random, we find about 400 words given to a description of various kinds of section posts.

"These mark the limits of track sections and should be smaller and less conspicuous than signs to be observed by trainmen. The Chicago, Burlington & Quincy Railway [it is Railroad, by the way] uses a post  $7\frac{1}{2} \times 5\frac{1}{2}$  in., having the top painted. It is painted mineral red, with a white patch at the top and a black figure. On the Pennsylvania Lines West of Pittsburgh an oval iron sign  $10\frac{1}{2} \times 20\frac{1}{2}$  in. is used, being secured by two bolts to the top of a post  $4\frac{1}{2}$  in. square. . . . The Northern Pacific Railway uses a 1-in. board  $21 \times 18$  in., with a frame  $\frac{3}{4} \times 2$  in., and nailed to a post  $6 \times 4$  in., 7 ft. long, set 3 ft. in the ground. . . . One of the simplest signs is a white board  $8 \times 18$  in. on a post with the numbers of the sections in black, but the Atchison, Topeka & Santa Fe Railway dispenses with the board and uses only an oak post  $2 \times 6$  in., 6 ft. long, set edgewise to the track, 6 ft. from the rail, with the section numbers painted on opposite sides. The post is brown, with a white top having a black border, and lettered 'Sec. 123' and 'Sec. 124,' the letters reading downward."

We have quoted this passage at considerable length, because it is characteristic of the whole book. Page after page goes on in this same way.

But if the author cannot weigh and discriminate among his facts, he can at least chide and admonish gently tow us along in the path of virtue. It is one of his hobbies that "the importance of the track and track work in their relation to the operation of the railway, and the proportion which the expenditures on track maintenance bear to the total operating expenses, are not as generally recognized as they should be, even by railway officers." This theme he loves to dwell on, and yet when we consider that the ablest and most conscientious group of men in America are spending \$144,000,000 a year to maintain way and structures, \$114,000,000 a year to maintain locomotives and rolling stock and \$431,000,000 a year for conducting transportation, we question very much indeed if they do not appreciate the relative importance of each one of these items. Still it is easy to say that they do not appreciate it, and from the vagueness of the statement it is impossible to disprove, and all those who are interested in the matter are disposed to face the accusation much as the amiable Socrates faced the disciplinary efforts of Xantippe. "It pleases her and don't hurt me."

The author's hobby and a naturally didactic temper lead him to say many banalities with an air of authority, as for instance, "it being assumed that when once a railway is built there need be but little work done upon it to keep it in condition." What adult man assumes this? "The renewals are too frequently considered as a comparatively unimportant item in the expense account." Who ever thought so? "At small, unprotected crossings, where all trains are required to come to an absolute stop, there is likely to be increased wear of rails. The extent of the wear will vary with the local conditions of grade, speed, traffic, etc." "Every interlocking plant should have home and distant signals. If an engineman finds the distant signal clear he knows he has the right of way over the crossing." Of station nameboards, we are informed that "the signs should not be less than 18 in. wide, the length varying with the name to be painted on it." "The bramble scythe is used for cutting brambles and strong weeds, while the brush scythe is used for brush and young bushes. Both of these should be fitted to brush snaths." We are tempted to quote Carlyle's summing up of the intellectual possessions of Robespierre, but we refrain, for we remember that these chidings and injunctions do not hurt Socrates.

But now that we have found so much fault with the methods of the author of this book, we are bound to say that it is far and away the most complete collection of information on railroad track and track material that has ever been made. The mass of facts as to the practice of the railroads of the United States, and to some extent elsewhere, is so great, and the drawings are so carefully made and complete that the book stands entirely alone. We do not exaggerate in saying that a copy of this book should be in the office of every engineer of maintenance of way, every division superintendent who bothers himself with the details of track, every general roadmaster, every supervisor of road who is in training for the engineer corps, and every editor who has occasion to deal with subjects of this class. We regret, however, that it was not made one-third as large and three times as val-

uable, which might well have been done with the information now between its covers.

The *Engineering Magazine*. The enterprising Mr. Dunlap has started a European edition of the *Engineering Magazine*, which is published at 222 and 225 Strand, London. The first issue (for October) is before us. The articles are identical with those in the American edition but the editorial departments are different; that of Civil Engineering is edited by Mr. H. Graham Harris; Electrical Engineering, by Mr. James Swinburne; Mechanical Engineering, by Mr. W. Worby Beaumont, and Mining and Metallurgy by an editor whose name will be announced later. The engineering index appears to be identical. Naturally there is some difference in the advertising pages.

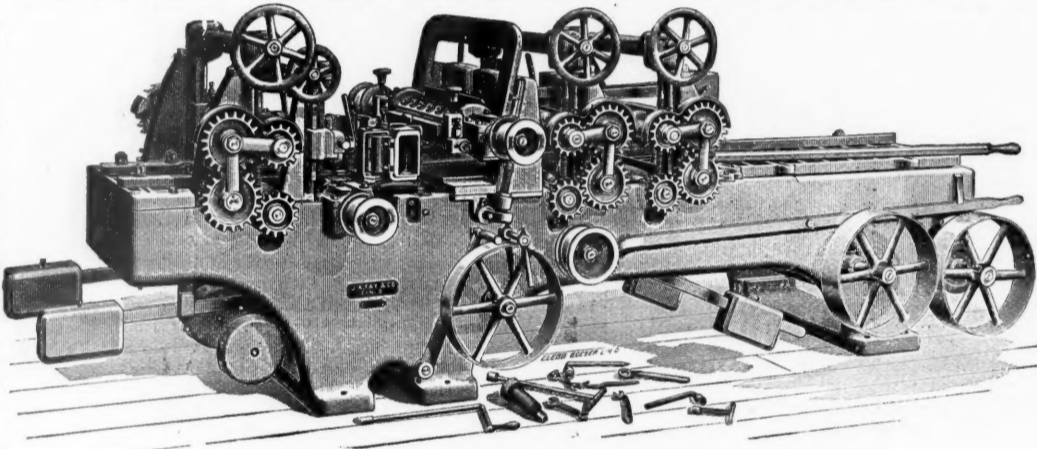
When the *Engineering Magazine* began its career some six years ago we gave it three months to live. Our forecast of its fate was so far wrong that we shall venture no prophecy as to the fate of the European edition, merely saying that it deserves a long and healthy life and that we hope that it will attain such a life.

## A Six-Roll, Double Cylinder Planing and Matching Machine.

This new style planing and matching machine will plane one or two sides of material up to 26 in. wide and 8 in. thick; will plane two pieces of uneven thickness at the same time up to 12 in. wide and 8 in. thick, and will dress four sides of material from 2 in. to 18 in. wide and 8 in. thick.

The cylinders are made of forged steel and slotted on all four faces. The journals are  $2\frac{1}{4}$  in. in diameter, machine ground, and supported in long connected bearings with large oil chambers. The cylinder pulleys on each end of the cylinders are made with a taper and held on the cylinders by a nut on the end. The lower cylinder is locked in position and adjustable vertically by means of a crank wrench that engages a raising-shaft and gear inside the frame.

The matching mechanism is between the two cutting cylinders, and consists of heavy hangers carrying the



Six-Roll, Double Cylinder Planing and Matching Machine.

cutter spindles, all mounted on girts provided with a drop-matching attachment for lowering the entire mechanism below the line of the bed without disturbing the cutter heads. The top plates of the matcher hangers are independent of the balance of it. The matcher clip is arranged with an adjustable toe that can be moved to and from the cut, and attached to the clip is a hood to which the shaving exhaust pipe is connected. Matcher dogs connect with the hangers and project past the cut of the heads. The matcher hangers are moved by independent screws across the bed of the machine, each one with an independent locking device. The matcher spindles are  $2\frac{3}{8}$  in. in diameter in their bearing, and  $1\frac{1}{2}$  in. where the cutter heads are applied.

The pressure bar is divided, and in front of the bars are two rolls 4 in. in diameter, which receive the material and lift the bar to receive the stock. The bar behind the upper cylinder is slotted, and carries shoes for holding material as it passes to the side heads. The bar over the lower cylinder is supported on an independent housing and held in position by a lock bolt and lever.

There are six feeding rolls 7 in. in diameter. The upper feeding rolls are divided in the center so that two pieces of unequal thickness may be planed at one time. These rolls are independently weighted and are raised and lowered by hand wheels. The rolls are driven by a train of gearing, and with expansion gears connected and supported by links on each side of the machine. They are weighted, and yield for all ordinary variations in thickness. The countershaft has tight and loose pulleys  $14 \times 10$  in., and should make 900 revolutions. The machine is built by J. A. Fay & Co., Cincinnati, O., and is furnished with four speeds, 25 ft., 35 ft., 50 ft. and 65 ft. a minute. Other speeds can, however, be obtained.

## TECHNICAL.

## Manufacturing and Business.

The Corning Brakeshoe Co., makers of brakeshoes and railroad castings, with offices in Buffalo and Corning, N. Y., has opened an office for the sale of the Corning brakeshoe in New York City, at 35 Nassau street.

The Davis & Egan Machine Tool Co., Cincinnati, O., has been awarded a contract by the United States government for one 30-in. lathe, four  $18 \times 8$ -in. engine lathes and eight 25-in. standard drill presses.

The Railway Cycle Mfg. Co., of Hagerstown, Ind., has recently made a shipment of inspection cars to the Southern Railway. This road was among the first to use the Hartley & Teeter inspection cars, having bought the twentieth car made, and has continued the purchase of these machines. The first car ordered by this road is still in service.

The principal office of the Pearson Jack Co. has been changed from 156 Fifth avenue, New York City, to 64 Federal street, Boston, Mass. The New York office will be located at 245 Broadway, in charge of George M. Brown, Manager.

The J. & E. Stevens Co., Cromwell, Conn., will rebuild its foundry building, recently burned. The framework will be steel, and the covering corrugated iron. The Berlin Iron Bridge Co., of East Berlin, Conn., has the contract for furnishing and erecting these buildings in accordance with their designs. The main foundry portion is 40 ft. wide and about 200 ft. long. There are two small brick buildings having a steel roof, one a boiler shop and the other a plating room. All the buildings are lined with Berlin patent lining.

The Clayton Air Compressor Works report that their sales for the month of October were more than any preceding month in the history of the business and three times greater than their average monthly sales for five years past. These works are now building one 25-H. P. compressor for 3,500 lbs. pressure and one 50-H. P. compressor for 2,500 lbs. pressure for the Western Mfg. & Oil Co., Newark, N. J. They also have orders in hand for a compound air compressor ordered by Fraser & Chalmers, of Chicago; a duplex air compressor for the Deane Steam Pump Co., Holyoke, Mass.; three duplex air compressors for compressed air shop plants, two air compressors for the Consolidated Pneumatic Tool Co., one air compressor for sand blast work, one for operating pneumatic railroad signals, two compressors for air lift pumping plants, two compressors to the Shone Co., of Chi-

cago, for its pneumatic sewerage system, and one large duplex compressor for the Consolidated Gas Co., New York.

The Case Mfg. Co., of Columbus, O., will build a new steel and brick building, designed especially for building all kinds of cranes. It will be  $165 \times 76$  ft. and two stories high and the machinery with which it will be equipped will be worked by electricity. The New Columbus Bridge Co., of Columbus, O., will furnish all the steel work for the building.

It is stated that the Anniston Pipe & Foundry Co., of Anniston, Ala., is in the market for electric cranes and motors for driving same, blowers and other foundry equipment.

## Iron and Steel.

The Ohio Steel Co., of Youngstown, O., is reported as considering building two new blast furnaces.

The blast furnace of the Thomas Iron Co., at Hellertown, near South Bethlehem, Pa., resumed work Nov. 4 after an idleness of two years.

The plant of the East Chicago Iron & Steel Co., at East Chicago, Ind., has again been ordered sold, the date having been set for Nov. 17. The upset price has been reduced from \$50,000 to \$40,000.

The directors and officers of the newly organized Atlantic Iron & Steel Co. are: A. M. Byers and W. P. Snyder, of Pittsburgh; F. B. Richards, of Cleveland; Alexander McDowell, A. W. Thompson and Edwin N. Ohl, of New Castle, Pa. President, A. M. Byers; Secretary and Treasurer, A. W. Thompson, and General Manager, Edwin N. Ohl. E. N. Ohl and William E. Reis, receivers for the old firm, have about wound up its affairs, and in two or three weeks will be ready to turn over the plant at New Castle to the new company.

The furnaces of the new skelp mill of the Reading Iron Co., at Reading, Pa., were put in blast Nov. 8.

A charter was granted at Hamburg, Pa., Nov. 9, to the P. L. Kimberly Co., of Sharon, Pa., to make iron and steel. The directors are: P. L. Kimberly, President; George A. Baird, R. S. Henderson, William S. Roberts, of Sharon, and Alexander W. Thompson, of New Castle.

At the sale of the property of the Glendon (Pa.), Iron Co., Nov. 4, which included furnaces, ore mines and considerable other real estate, no bids were made for the furnaces. These have been idle for about three years.

The Chambersburg Engineering Co. has been formed by William H. Derbyshire, James Austin, John Leisenring, H. B. Price and M. Harvey Ivins for the purpose of making iron and steel and other materials. The plant of the Taylor Mfg. Co., at Chambersburg, Pa., has been bought.

The new plant of the Braeburn Steel Co., at Braeburn, Pa., has been finished. The furnaces, roll trains and forging machinery are of the most improved type. The company will make a specialty of fine tool steel for all purposes and of forgings for die work and all difficult shaped tools. Bar steel for tools, springs and machinery will be among the other products made. The plant will be under the supervision of William Metcalf, who has had considerable experience in the steel business.

The Onondaga Steel Works of the Sweets Mfg. Co., Syracuse, N. Y., are to be sold under foreclosure Nov. 17, at 10 o'clock a. m. The plant consists of 15 heating furnaces, six hammers, from 200 to 2,000 lbs. each, eight-trains of rolls, four 9-in. and four 12-in. and three steel cementing furnaces. The plant is arranged to manipulate old Bessemer steel rails and locomotive tires and convert iron into blister steel.

#### New Stations and Shops.

The new shops of the Georgia & Alabama Railway, at Americus, Ga., consist of the following buildings: paint shop, 50 x 150 ft., two stories high, of wood, with two tracks running through and equipped with adjustable scaffold for the workmen; the second floor is used for upholstering and varnishing; planing mill, two-story brick building, 50 x 200 ft., with heavy machinery on the ground floor and light machinery and cabinet and pattern shops above; car repair shop, a wooden building 60 x 200 ft., with three tracks; machine shop, 60 x 120 ft. brick, with drawing-room above; erecting shop, brick, with five stalls; blacksmith shop, brick, 30 x 120 ft.; coppersmith shop, brick, 20 x 30 ft.; foundry, brick, 60 x 60 ft.; storeroom, two stories, brick, 50 x 150 ft.; round-house, with 32 stalls; oil and waste house, brick, 30 x 55 ft.; tin shop, wood, 20 x 30 ft.; pattern storage room, wood, 20 x 30 ft.; engineer's house, 20 x 30 ft. and an air-brake instruction room, brick, 25 x 40 ft. All of these buildings are most conveniently arranged, the paint, planing, tin and repair shops being near together, and the other shops some 100 yds. to the south of the car departments. The following is a list of the machinery with which the plant is equipped and was all bought through the Niles Tool Works, of Hamilton, O.: One air compressor-cylinders 12 x 12 x 18 in., made by the Laidlaw-Dunn-Gordon Co., Cincinnati, O.; two No. 2 Boyer pneumatic hammers and one Boyer piston air drill, Chicago Pneumatic Tool Co., Chicago, Ill.; one hydraulic crank pin press, Richard Dudgeon, New York City; one pneumatic painting machine, two rotary tapping and drilling machines, one air motor and fixtures, for revolving driving wheels, for valvesetting, and one 36-in. pneumatic riveter, Baird Portable Machine Co.; one 22-in. rotary valve seat planing machine, one 45-in. locomotive cylinder boring bar, with attachments; one No. 2 portable crank pin turning machine and one 4-in. pneumatic hoist, 4 ft. lift, Pedrick & Ayer Co., Philadelphia, Pa.; one large four-sided car sill and timber dressing machine, to work timber up to 12 x 16 in. to surface two sides at once 24 in. wide, Glencove Machine Co.; one 1,250-lb. single stand steam hammer, 30-in. stroke, Morgan Engineering Co., Alliance O.; one 16-in. slotting machine and one combined punch and shearing machine, 36-in. throat, Niles Tool Works, and two stationary blast forges, with patented down-draft smoke-exhausting hoods, blast gate and anti-clinker dumping tuyere iron, Buffalo Forge Co., Buffalo, N. Y. We are indebted to Mr. Cecil Gabbett, Vice-President and General Manager of the road, under whose supervision the shops were planned and built, for the information given.

The New York & Ottawa Railway Company have let the contract for building stations to Mr. Warwick, of Brockville, and the Rathburn Co., of Deseronto, Ont. Fairbanks, Morse & Co., of Chicago, will build the tanks.

The Great Northern has awarded a contract to Schmidt Bros., of Superior, Wis., for building at West Superior new repair shops, to be 360 x 100 ft., of brick and stone, and a boiler-house 50 x 80 ft., all of the work to be finished in 90 days. The improvements will cost about \$60,000.

#### Interlocking.

The Standard Railroad Signal Co. is to make a large interlocking machine and the necessary signal apparatus for the New York, New Haven & Hartford at Brayton avenue, Providence, R. I. The machine will have 92 working levers and eight spare spaces.

#### Extension of Automatic Signals on the Pennsylvania.

The Pennsylvania Railroad has decided to put in automatic electro-pneumatic block signals on the New York Division, from Monmouth Junction, 41 miles from New York and 15 miles north of Trenton, to Holmesburg Junction, 77 miles from New York. This portion of the road has four tracks throughout its length, and most of the switches are already concentrated and interlocked, with suitable signals. This mechanical interlocking will not be disturbed, except so far as it is necessary to interlock the signals and switches with the automatic signals to insure safety. The apparatus is furnished by

the Union Switch & Signal Co., but will be put in by the railroad company's men. There will be three air compressors, one at Monmouth Junction, one at Trenton and one at Bristol. Engines for pumping water, or other purposes, are already established at these places, but the plants will have to be slightly enlarged. The New York Division is already equipped with electro-pneumatic block signals from Holmesburg Junction to Mantua (West Philadelphia), and from Jersey City to Perth Amboy Junction, so that on the completion of the work now undertaken the whole of the main line of this division will be thus equipped, except the 21 miles from Perth Amboy Junction to Monmouth Junction. Between these two points lies New Brunswick, where extensive alterations in the grade of the road are yet to be made.

#### The Atlantic Avenue Improvement, Brooklyn.

Mr. J. V. Davies has been appointed as engineer to the Board for the Atlantic Avenue Improvements of the city of Brooklyn, with offices at Atlantic avenue, corner Franklin avenue, Brooklyn. He will prepare the maps, specifications and estimates for the improvements contemplated by that board and to be executed jointly by the Long Island Railroad and the city of Brooklyn.

#### Treated Ties and Tie-Plates—Southern Pacific.

From the annual report of the Southern Pacific we learn that about 18 per cent. of the ties in track are burnettized or creosoted, and 64 per cent. are of redwood, cypress, cedar and bois d'arc, which do not readily decay, and the life of which is prolonged by use of tie-plates. About 18 per cent. of untreated ties remain to be replaced by burnettized or redwood ties as renewals become necessary. About one million ties are burnettized each year at the four wood-preserving plants of the company. The tie-plates in use would provide for 961.4 miles of continuously tie-plated track, and a large number of plates have been ordered for the coming year. About 20 per cent. of the timber trestles have been renewed with creosoted timber and from 300,000 to 400,000 lin. ft. of piling and about six million feet board measure of lumber are creosoted annually at the wood preserving plants of the company for use in renewing trestles, docks and wharves. Since the company acquired control of the properties now operated by it it has spent over \$16,000,000 in substituting steel and iron bridges for wooden bridges, masonry foundations for timber foundations and on ballasting, rolling stock, treated ties and other betterments and additions and improvements to the property.

#### Rapid Transit in New York.

The commissioners appointed by the Appellate Division of the Supreme Court to inquire into the public utility of the rapid transit project as last laid down by the commissioners handed in their report on Monday afternoon of this week in favor of building the road. It is expected that the motion to confirm will be made Nov. 22. The commissioners consisted of Messrs. Arthur D. Williams, John Sabine Smith and George W. Young, Mr. Frissell, who was originally appointed, declining to serve.

According to the report, the road as proposed is entirely practicable from an engineering standpoint. The cost will not exceed \$35,000,000, and probably will not be more than \$30,000,000. It is estimated that the proposed road would have a daily capacity of 425,000 passengers, and it is believed that by the time the road is completed the normal growth of traffic will give such a passenger business as will yield an income of \$5,475,000. With working expenses at 60 per cent. of the passenger receipts, interest on \$35,000,000 at 3½ per cent., interest and depreciation of equipment at 10 per cent. of its cost and a sinking fund payment of \$350,000 a year the road would still earn, it is believed, \$18,000 net a year. The commissioners judge that it will be feasible to build the road at the estimated cost without exceeding the constitutional limit of the city's bonded debt, and conclude that it ought to be built and worked.

#### Section 11 of the Boston Subway.

Mr. Charles Linnehan, who bid \$67,507.50 for the construction of Section 11 of the Boston Subway, has been awarded the contract. The specifications require that this section shall be completed by June 1, 1898, with a premium of \$50 a day for each day in which the work is completed prior to that date.

#### Electric Turntables on the Baltimore & Ohio Southwestern.

About two and a half years ago a master mechanic of the Baltimore & Ohio Southwestern devised an arrangement for moving the 60-ft. turntable at Chillicothe, O., by means of an electric motor. The motor was placed on a separate frame and geared to an old car-wheel which ran on the circular track. The weight of the frame, motor and car-wheel was sufficient to give necessary adhesion, and on trial it was found that the heaviest engine could be turned completely around in 56 seconds. The current is carried to the motor by an overhead wire which is connected directly over the center of turntable by two brass rings so that a perfect contact is always obtained, thus furnishing a good conductor for the current to the motor. The current is controlled by means of a handle attached to a rheostat so that the motor can be run in either direction and at such speeds as may be desired. The cost of the device complete, including the motor, did not exceed \$500 and after two and a half years of constant use it is in good order and has given such satisfaction that the turntable at Park street, Cincinnati, was likewise equipped in a similar way. In this case, however, the

current is taken under ground and connection made around the center cone of the table so that all wiring is concealed. The electric power for this table is purchased from the Union Depot Co. through a meter, and the cost of power for May, June, July and August was \$29. This turntable is used on an average of 50 times each day, thus making a cost of less than one-half cent for each time the table is turned, while if it was operated by hand it would have cost about \$738 (12 cents for each engine), which shows a saving of \$709, without allowing for repairs, which, however, will never be very large.

The Baltimore & Ohio Southwestern has also just completed a plan for equipping the turntable at Shops, Indiana, with a device similar to the one in use at Chillicothe, and which will be working in a few weeks. An even better showing can be made there than at Park street, Cincinnati, inasmuch as the table is in more constant use.

#### Railroad Supplies for Norway.

Newspaper reports state that the Norwegian State Railroad Department is about to ask for bids on railroad materials, including rolling stock, permanent way and machinery, amounting in all to about \$1,000,000. American makers are instructed to apply to the United States Consul, Mr. Gerhard Gade, at Christiania. Mr. L. Segelcke, Christiania, Norway, is Director General of the State Railroads. At the end of 1895 there were 1,014 miles of State railroad in Norway and 59 miles of private road.

#### THE SCRAP HEAP.

##### Notes.

Brown's discipline has been adopted on the Metropolitan Street Railway of New York City and on the Canal & Claiborne Railroad of New Orleans.

The Chesapeake & Ohio Hospital Association has been organized by the employees of the road named. It is to be conducted under the direction and patronage of the company, five of the directors of the Association being employees and five officers of the road. The company has furnished a building for a hospital; it is the former Gladys Inn, at Clifton Forge, Va. Employees will support the hospital by small monthly contributions.

The inability of the Attorney-General of North Dakota to proceed in the injunction suit brought against the Railroad Commissioners by the railroad companies seems to have caused considerable friction in the executive department of that state, and it is reported that the Governor has decided to remove the difficulty, which is a lack of funds in the State Treasury, by advancing out of his own pocket the money necessary to enable the Attorney-General to conduct the necessary legal proceedings.

The Chicago & North Western now has the block system in operation from Boone to Clinton, and the signals are being put in as fast as possible all along the line to the Missouri River. The space interval is now in force between Chicago and Minneapolis, so that within a few months the company will have about 800 miles of line thus operated. Since the adoption of the space interval in Iowa, 104 additional telegraph operators have been employed on the main line in that state. The average length of the blocks is about four miles.

The Southern Pacific and the Atchison lines west of Albuquerque have put a check on free transportation by notifying connections that they "find it necessary, in order to relieve themselves of the constantly increasing burden of travel on free transportation, issued to connecting and other railroad lines, for freight or ticket agents and clerks, trainmen and other subordinate employees, to establish a rule that no requests for passes will be honored after Dec. 1, 1897, in the territory south of Portland and west of Ogden, El Paso, Albuquerque and Deming, for subordinate employees; but a special rate of one-half tariff rates will be granted them instead. Exceptions to this rule will, however, be made with pleasure on receipt of autographic requests from the President, Vice President, or General Manager." Other roads are requested to ignore requests for favors for employees of the same classes of the roads issuing this circular, unless signed, by the President, the Assistant to the President, one of the Vice-Presidents, or the General Manager.

#### Some of the Old English Steel Rails.

In tearing up a siding on the Straitsville division of Baltimore & Ohio Railroad, the other day, the section men discovered that several of the rails had been made in 1863. Subsequent investigation revealed the fact that these rails were part of a lot that were bought in England during the war at a cost of \$125 a ton in gold. The rails were still in fair condition, and for light motive power would last 10 years longer.

#### Lese Majesty.

The editor of the *Volksrecht*, of Breslau, who commented upon the frequency of railroad accidents in Germany, has been indicted for "insulting" Herr Thiele, the Minister of Public Works.

#### A South African Railroad Opened.

A press dispatch from Cape Town says that the Bulawayo Railroad was formally opened on Nov. 4.

#### Too Many of Them Have Come to America.

A complaint comes from Austria that we should never have expected in any country of Europe. There is a dearth of civil engineers. Mechanical engineers are sufficient in numbers. The Railroad Minister has besought the Minister of Education to let the pupils in the engineering schools know this, and he has notified them that for some years to come civil engineers who are Austrian citizens, have graduated at an Austrian engineering school and passed with credit the two state examina-

tions required, can find appointments in the state railroad service immediately after finishing their studies, with salaries beginning at \$400 to \$450, horse money, "and very good chances of promotion."

#### LOCOMOTIVE BUILDING.

The Pennsylvania Railroad is building five more class H4 locomotives at its shops.

It is understood that the Intercolonial Railway is making drawings for a number of new locomotives.

The Baldwin Locomotive Works are building six consolidation locomotives for the Western Maryland Railroad.

The Richmond Locomotive Works are building two locomotives for the Richmond, Fredericksburg & Potomac.

The Dickson Locomotive Works, of Scranton, Pa., have received an order to build a second compressed air locomotive for the Delaware & Hudson Canal Co., a duplicate of the one built for the same company some months ago.

The Grand Trunk has placed an order for four mogul and four 10-wheel engines with the Schenectady Locomotive Works and for six moguls and four 10-wheelers with the Baldwin Locomotive Works. They are for use on lines in the United States.

The Baldwin Locomotive Works have received an order to build 16 consolidation engines, with 21 x 26 in. cylinders and 50 in. drivers, and eight passenger locomotives, with 18 x 24 in. cylinders and 66 in. drivers for the Central Railroad of Brazil.

The Cleveland, Cincinnati, Chicago & St. Louis Railroad has ordered from the Richmond Locomotive Works a heavy consolidation locomotive. Three sets of cylinders were also ordered to convert that many simple engines into Richmond compounds.

The Baldwin Locomotive Works have been awarded a contract to build 12 mogul freight locomotives with 15 x 24 in. cylinders and 50 in. drivers, and 10 10-wheel passenger locomotives, with 16 x 24 in. cylinders and 62 in. drivers, for the Finland State Railways.

The three compound consolidation freight locomotives now being built by the Schenectady Locomotive Works for the Ogdensburg & Lake Champlain Railroad, as stated in our issue of Oct. 15, will have 22 x 34 x 28 in. cylinders, 54 in. driving wheels and weigh 150,000 lbs. The engines are to be operated on the heavy grade between Moira and Rouse's Point. The engines are of the latest design, have steel driving wheels and all the modern improvements; cast and pressed steel being used largely in order to give the maximum size of boiler and bearings obtainable with the above weight. The boiler pressure is 200 lbs. per square inch.

The Brooks Locomotive Works, of Dunkirk, N. Y., are building two simple Mastodon type locomotives for the Great Northern. They will have 21 x 34 in. cylinders, with piston valves; 55 in. (outside diameter) driving and 33 in. truck wheels, with steel centers; firebox, 124 x 40 1/2 in., inside measurement; boiler, improved Belpaire type, 78 in. in diameter at front cylinder course, with 376 tubes, 2 1/4 in. in diameter and 13 ft. 10 1/2 in. long; driving wheel base, 15 ft. 10 in., with a total wheel base of engine, 26 ft. 8 in. and of engine and tender, 53 ft. 6 in.; boiler pressure, 210 lbs.; mud ring, double riveted and alligator guides. They will be equipped with Krupp tires, A. French Co.'s springs, Jerome metallic packing, Monitor injectors, Krupp No. 1 tender wheels, Monarch brake beams, New York brake fixtures and 25 in. headlights.

#### CAR BUILDING.

The Canadian Pacific is building 12 passenger cars at its shops.

The Glucose Sugar Refining Co., of Buffalo, N. Y., with offices in the Wool Exchange Bldg., New York City, intends to build 100 tank cars at once.

The St. Louis & San Francisco has placed orders with the St. Charles Car Co., of St. Charles, Mo., for 100 ventilator cars, and with the Missouri Car & Foundry Co., of St. Louis, Mo., for 100 furniture cars.

The Cleveland, Cincinnati, Chicago & St. Louis has placed an order with Barney & Smith for two parlor cars, one dining car and two to four express cars 55 ft. long for carrying horses shipped by express.

The Metropolitan West Side Elevated, Chicago, has ordered 25 new trailers from the Pullman Palace Car Co. These cars are to be like those already in service, and will be finished about the middle of January.

The Schoen Pressed Steel Co., of Pittsburgh, Pa., is bidding on a large number of steel cars, ranging from 80,000 lbs. to 110,000 lbs. capacity. Among the roads requesting bids are the Pennsylvania and Central Railroad of New Jersey.

The Minneapolis & St. Louis is in the market for 200 box cars, 34 ft. long and of 60,000 lbs. capacity. Diamond truck frames, Westinghouse air-brakes, Monarch brake beams, Standard couplers, Buttler drawbar attachments, Winslow roofs and Dunham doors are specified.

Swift & Co. have placed an order for 100 additional refrigerator cars with the Wells & French Co., of Chicago, and for 100 more with the Barney & Smith Car Co., of Dayton, O. This company some time ago ordered 350 cars from the Michigan-Penninsular Car Co. and 210 from the Wells & French Co., making a total of 760 cars ordered in the last two months.

The Norfolk & Western has placed orders for 500 box cars with the Ensign Mfg. Co., of Huntington, W. Va., and for 250 of the same type with Murray, Dougal & Co., of Milton, Pa. Two hundred and fifty will also be built at the Roanoke shops of the railroad, the delivery to begin from all three places in five weeks. Some of the specifications were given in our issue of Oct. 29. Chicago roofs and Helm and Tower couplers are also specified.

#### BRIDGE BUILDING.

Bellaire, O.—The Bellaire & Benwood Bridge Co., chartered three years ago to build a highway bridge over the Ohio River at this place, has secured the real estate needed for its terminals, and has ordered its engineers to prepare final plans for the structure. The channel span will be 800 ft. long.

Chicago, Ill.—The following bids were opened Nov. 3 by Thomas Kelly, President Board of Trustees, Sanitary District of Chicago. Those in the first column are for the Chicago, Madison & Northern double-track draw span, 474 ft. long, and those in the second column are for the Chicago & Calumet Terminal Railway's double-track draw span, 312 ft. long:

C., M. & N. C. & C. T.

Toledo Bridge Co.	\$71,164	\$91,974
Detroit Bridge & Iron Works	78,637	34,986
A. J. Tullock	79,850	34,871
King Bridge Co.	80,300	34,710
Carnegie Steel Co.	80,393	36,051
American Bridge & Iron Co.	81,200	34,725
Pennsylvania Steel Co.	81,950	35,775
New Jersey Steel & Iron Co.	82,556	37,987
Youngstown Bridge Co.	82,980	36,814
J. G. Wagner Co.	86,400	36,900
Edge Moor Bridge Co.	88,150	39,310
Wisconsin Bridge & Iron Works		28,877

The Acting Secretary of War has approved the plans for a new bridge to be built over the Chicago River at Archer street.

Clarksburg, W. Va.—The contract for a steel truss bridge over Elk River has been given to the Canton Bridge Co. by the Elk Bridge Co., at \$19,000. The bridge will be 518 ft. long with a 27-ft. roadway.

Cleveland, O.—Plans have been made for an iron swing bridge at Center street, to cost about \$120,000.

Columbus, O.—The contract for the approaches for the Central College Bridge has been given to B. A. Swickard, at \$1,170.

Essex Junction, Vt.—The Central Vermont Railroad, G. H. Thomson Consulting Engineer, has awarded the contract for two riveted lattice spans, of 107 ft. each, to the King Bridge Co., Cleveland, O.

Fort Plain, N. Y.—The contract for a lift bridge over the Erie Canal, at River street, has been given to the Havana Bridge Works at its bid of \$10,351. The Hilton Bridge Co. bid \$10,746 and the King Bridge Co. presented an informal bid of \$12,300.

Hull, Que.—Mr. H. J. Beemer, President of the Ottawa & Gatineau Valley, states that plans for the inter-provincial bridge are being completed and that work will be commenced at an early date. The new central station in this place will be the point from which the bridge will start.

Lingwick, Que.—An iron bridge is to be built over the river at this place.

McKeesport, Pa.—The council has passed the Millfin township bridge ordinance, and work will begin on the new structure in the early spring. The bridge will be built across the Monongahela river from the foot of Market street to Risher station.

Montpelier Junction, Vt.—The Central Vermont has given the contract to the King Bridge Co. for a plate girder bridge of 108 ft. span.

Newbern, N. C.—The Secretary of War has approved the plans and location for a bridge to be built over the Trent River by the Commissioners of Craven County.

New York.—The Acting Secretary of War has approved the location and plans of a bridge to be built by the Department of Public Parks, between City Island and Pelham Bay Park.

North Duxbury, Vt.—The Central Vermont has awarded the contract to the King Bridge Co. for a riveted lattice bridge with two spans of 146 ft. and one of 122 ft.

Passaic, N. J.—Bids will be asked for a new iron bridge on West Twenty-fourth street, to cost not over \$1,650. The Committee on Seventh Ward bridges has the matter in charge.

Philadelphia, Pa.—It is said that the contract for a new steel bridge for the Pennsylvania Railroad at Frankford has been let to J. Goll & Co. The bridge will cost about \$50,000.

Port Huron, Mich.—The Acting Secretary of War has approved the plans and location for a bridge over Black River at Elmwood street.

Pottsville, Pa.—The contract for building the Washington street bridge has been given to Rickert & Otterbein of this place, at their bid of \$5,722.

Randolph, Vt.—The Central Vermont Railroad has awarded the contract for building a bridge of 129 ft. span of the lattice type to the King Bridge Co.

Roxbury, Vt.—The Central Vermont has given the contract to the King Bridge Co. for a deck-plate girder bridge of 108-ft. span.

Royalton, Vt.—The Central Vermont has awarded the contract to the King Bridge Co., for a riveted lattice bridge with four spans of 150 ft. each.

Salt Rock, W. Va.—The Acting Secretary of War has approved the location and plans for a bridge to be built over the Guyandotte River, by the Cabell County Court.

Scranton, Pa.—Petitions for a bridge over Schultzville Creek at Schultzville, for a bridge over Summit Lake Creek in South Abington, for a bridge over Willow Creek in the same township and for one over Parker's Creek in Waverly, have been filed with the Court and referred to the grand jury.

Sherbrooke, Que.—A new bridge to cost \$15,000 is proposed here.

Utica, N. Y.—Two new bridges will be built across the Erie Canal in this city during the winter, one at Broad street and the other on Whitesboro street. The plans are nearly completed, and the contracts will be let early in December so that the bridges may be finished before navigation opens in the spring.

Waterbury, Vt.—The Central Vermont Railroad has awarded the contract to the King Bridge Co. for a riveted lattice bridge with two spans of 138 ft. and 144 ft. respectively.

Woodstock, N. B.—The provincial government is about to build a steel bridge across Bull's Creek, Carleton County, about three miles below this town.

Woonsocket, R. I.—Plans and specifications will be made for the abutments of the Wood avenue bridge and bids will be asked by the Aldermen as soon as the plans have been approved.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago & Alton, quarterly, common and preferred, 1 1/2 per cent., payable Dec. 1.

Cleveland & Pittsburgh, quarterly, guaranteed, 1 1/4 per cent., payable Dec. 1.

Lehigh Coal & Navigation, 2 per cent., payable Nov. 30.

Pennsylvania, semi-annual, 2 1/2 per cent., payable Nov. 30.

Third Avenue, quarterly, \$2 per share, payable Nov. 29.

West Chicago Street, quarterly, 1 1/2 per cent., payable Nov. 15.

##### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Bridgton & Saco River, annual, for election of directors and other business, Bridgton, Me., Nov. 17.

##### Chicago Electrical Association.

A meeting of the Chicago Electrical Association was held Friday evening, Nov. 5, at Room 1737, Monadnock Block, Chicago. Mr. C. H. Sewall read a paper entitled "The Safe Current Capacity of Electrical Conductors."

##### Western Railway Club.

The next regular meeting of the club will be held Nov. 16, when the paper by Mr. Wm. Garstang on "Heating Passenger Cars," and the topical question "The Advantages of Cupping or of Corrugating Fire Box Sheets" will be considered.

##### The Western Foundrymen's Association.

The Western Foundrymen's Association will meet at the Great Northern Hotel, Chicago, Nov. 17, at 7:30 p. m. A paper on "Plaster Casts and Other Methods of Molding Shell Forms," by Mr. John C. Knoepfel, will be presented, and members are requested to submit comments in writing for the discussion. Questions relating to any phase of foundry practice are also requested from members, for discussion at future meetings.

##### Western Society of Engineers.

A regular meeting of the Western Society of Engineers was held Nov. 3, about 22 members being present. In the absence of the President and Vice-President, Mr. Isham Randolph presided. An amendment providing that when no nominations for officers of the Society are made by members as provided in Sec. 4 of Article II for the annual election, the board of directors shall only nominate one ticket, instead of two as at present, was adopted. After a discussion on technical education the meeting adjourned.

The Entertainment Committee announced that Mr. Isham Randolph would, by request, deliver a lecture at Central Music Hall Nov. 30 on the Chicago Drainage Canal, the proceeds to be given to the Society.

##### St. Louis Railway Club.

The next regular meeting of the St. Louis Railway Club will be held at Jefferson Barracks, St. Louis, Nov. 12. A paper will be presented by Geo. B. Leighton, President Los Angeles Terminal Railway, St. Louis, entitled "English Railway Practice." In view of the general interest taken in the discussion of the paper presented at the September meeting by Mr. J. A. Goben, entitled "Care of Passenger Equipment at Terminals," and at the request of several members, a further discussion of this paper will ensue at the November meeting. The paper presented by Mr. John S. Thurman at the October meeting, entitled "Advancement of American Railways and What We May Expect in the Future," will also be open for discussion. The Missouri Pacific has tendered the club a special train to carry the members to and from the Barracks.

##### Civil Engineers' Society of St. Paul, Minn.

A regular meeting of the Civil Engineers' Society of St. Paul was held Nov. 1. Mr. Woodman, Chairman of Committee on Membership, presented a table showing the requirements for membership in various branches of the Association of Engineering Societies, and the committee was requested to report at the next regular meeting recommendations as to membership and name. The Secretary, Mr. C. L. Annan, read a paper on "Paint Tests" by Mr. W. J. Wilgus. President Hilgard read "Some Notes on the Development of Water Powers." At Telluride, Col., a head of 900 ft. is utilized and power is transmitted to the various mining camps at a maximum distance of 14 miles. Even at a cost of \$120 per H. P. per annum, a saving of 25 per cent. over the old coal methods is claimed and the electric light appears quite generally in the miner's cabin. Water power is now transmitted 50 miles into Salt Lake City and 20 miles to Butte, with the possibility of greater power being brought in from a distance of 60 miles. Mr. Estabrook spoke of the relative cost of steam and water power at the Minneapolis mills.

##### American Society of Civil Engineers.

The Nominating Committee has presented the following ticket to be voted on at the next annual election:

President, Alphonse Fteley, New York City.  
Vice-Presidents, Edward P. North, New York City, and Frederic P. Stearns, Boston, Mass.

Treasurer, John Thomson, New York City.  
Directors, J. F. Deyo, New York City; John Kennedy, Montreal, Que.; Henry Manley, Boston, Mass.; Charles C. Schneider, Pencoed, Pa.; John J. McVean, Grand Rapids, Mich.; George Y. Wisner, Detroit, Mich.

All arrangements for the formal opening of the new Society House, No. 220 West Fifty-seventh street, have been placed by the Board of Direction in the hands of the following committee: Benjamin M. Harrod, President; Chas. Warren Hunt, Secretary; John Thomson, Treasurer; Horace See, Chairman Finance Committee; George A. Just, Chairman Building Committee.

Wednesday, Nov. 24, has been fixed as the date for the formal opening. The house will be open for inspection from 9 a. m. to 2 p. m. The opening ceremonies have been arranged as follows: In the afternoon, beginning at 3:30, the first meeting in the new house will be held in the auditorium, at which Mr. Harrod will preside, and addresses be made. Mr. Joseph H. Choate will deliver an oration. Admission will be by card only. Each member may secure a card for himself and for two guests (ladies or gentlemen).

In the evening at 9 o'clock there will be a house warming. Dancing may be expected, and supper will be served. Admission will be by card only. Each member will be entitled to one card for himself and for one lady. He may also secure additional cards for other ladies of his immediate family.

#### PERSONAL.

—Mr. Edward B. Guthrie, City Engineer of Buffalo, N. Y., has been appointed Chief Engineer of the Grade Crossing Commission of Buffalo, to succeed Mr. George E. Mann, deceased.

—Mr. W. A. C. Ewen, Vice-President of the Charleston & Western Carolina, with headquarters at Augusta, Ga., has resigned, to engage in other business. Mr. Ewen has been succeeded by Mr. Samuel Thomas.

—Mr. W. C. Rowley, heretofore Commercial Agent of the Michigan Central, with headquarters at Detroit, Mich., has been appointed Assistant General Freight Agent of that company, with headquarters at Bay City, Mich., to succeed Mr. E. E. Gerkins, deceased.

—Mr. J. G. Livingston, heretofore Purchasing Agent of the Lexington & Eastern, with headquarters at Lexington, Ky., has been appointed General Superintendent of the Intercoastal Railroad of Honduras, Central America, a road which is proposed to extend from Puerto Cortez, on the Gulf of Honduras, southeast to Amapala, about 180 miles.

—Mr. T. G. Golden, formerly General Superintendent of the International & Great Northern, with headquarters at Palestine, Tex., has been appointed Superintendent of the Galveston Joint Wharf Yard of the Gulf, Colorado & Santa Fe, the Galveston, Houston & Henderson and the Galveston, La Porte & Houston railroads, to succeed Mr. B. C. Collins, resigned.

—Mr. Oliver P. Dunbar, Superintendent of Motive Power and Cars of the Wheeling & Lake Erie, with headquarters at Norwalk, O., died suddenly at his home in that place Oct. 31. Mr. Dunbar has been in railroad service since 1854. He was appointed Master Mechanic of the Canada Southern (United States Division) in July, 1875, and held that office until Feb. 1, 1883, when he was appointed Master Mechanic of the Wheeling & Lake Erie. He was promoted to his late office last May.

—The Manufacturers' Club of Detroit has selected a Freight Commissioner in the person of Mr. John L. Moore, late of Sandusky, O., and formerly Secretary and Treasurer of the Cincinnati, Sandusky & Cleveland Railroad. When that road was separated from the Indiana, Bloomington & Western Mr. Moore became General Manager, which place he held until the road was sold to the Cleveland, Cincinnati, Chicago & St. Louis. After that he was engaged in railroad enterprises for a time and then became a manufacturer in Sandusky.

—Mr. J. E. Galbraith, who recently resigned as General Freight and Passenger Agent of the International & Great Northern, has been appointed Traffic Manager of the Cleveland Terminal & Valley, with headquarters at Cleveland, O., and also General Agent of the Baltimore & Ohio at that point. These two positions were formerly held by L. Rush Brockenbrough, who is now General Freight Agent of the Baltimore & Ohio lines west of the Ohio River, with headquarters at Pittsburgh, Pa. Mr. Galbraith prior to 1888 was Assistant General Freight Agent of the Missouri Pacific lines south of Texarkana and Denison, Tex., with office at Dallas, Tex. He was then appointed General Freight and Passenger Agent of the International & Great Northern, and held that office until the following year, when he was made Traffic Manager of the same road. In 1891 he was again appointed General Freight and Passenger Agent, which office he held until last summer.

—Gen. James C. Duane, President of the Aqueduct Commission of the City of New York, died of apoplexy on the morning of Nov. 8 at his home in that city. He was a native of Schenectady, N. Y., having been born there in 1825. He graduated from Union College and later from West Point in the class of 1848, in which class he ranked second. He was appointed at once into the Corps of Engineers and later in his career declined a captaincy in the line as he preferred to stick to the corps. He was made Brigadier-General and Chief of Engineers, U. S. Army, Oct. 11, 1886, and was retired for age two years ago. His career in the army was the familiar one of the officer of engineers. The story is that of honorable and able performance of duty in an inconspicuous way. He had arduous and responsible war experience and was for a time the chief engineer officer of the army of the Potomac and was promoted and brevetted for distinguished service. He was appointed Aqueduct Commissioner by Mayor Hewitt July 31, 1888, and at the first meeting of the Board after his appointment he was made President, which office he held until his death. General Duane was made an Honorary Member of the American Society of Civil Engineers Nov. 20, 1895, a distinction which but very few men of the profession have ever reached.

#### ELECTIONS AND APPOINTMENTS.

**Atlantic & North Carolina.**—D. M. Stanton has been elected Secretary and Treasurer; J. W. Watson has been elected Auditor, and S. W. Hancock, General Counsel, all with headquarters at New Bern, N. C. S. L. Dill has been appointed Superintendent and General Freight and Passenger Agent, with headquarters at New Bern. The above elections and appointment took effect Oct. 1.

**Atlantic Coast Line.**—J. S. Hartsell has been appointed Soliciting Agent, with headquarters at Tarboro, N. C. J. S. Walpole has been appointed Soliciting Agent, with headquarters at Charleston, S. C., to succeed W. E. Renneker.

**Baltimore & Ohio.**—J. F. Galbraith, formerly General Freight and Passenger Agent of the International & Great Northern, has been appointed General Agent of the Baltimore & Ohio and Traffic Manager of the Cleveland Terminal & Valley, controlled by that road, with headquarters at Cleveland, O., to succeed L. Rush Brockenbrough, transferred.

**Baltimore & Ohio Southwestern.**—F. D. Gildersleeve has been appointed City Passenger and Ticket Agent at St. Louis, Mo., to succeed W. P. Townsend.

**Birmingham & Atlantic.**—In addition to his office as Auditor, A. S. Vaughan has been appointed General Passenger Agent, with headquarters at Talladega, Ala.

**Charleston & Western Carolina.**—Samuel Thomas has been elected Vice-President, with headquarters at Augusta, Ga., to succeed W. A. C. Ewen, resigned.

**Chicago Great Western.**—C. R. Berry has been appointed Agent, with headquarters at St. Joseph, Mo., to succeed J. H. Hamill, who was City Passenger and Ticket Agent at that place. A. J. Stratton has been appointed General Agent at San Francisco, Cal.

**Chicago, Milwaukee & St. Paul.**—L. L. Downing has been appointed Commercial Agent in charge of freight and passenger traffic in the Utah District, with office at Salt Lake City, Utah, to succeed Alexander Mitchell, resigned. The appointment took effect Nov. 1. The office of J. W. Casey, Traveling Passenger and Freight Agent, has been removed from Seattle, Wash., to Portland, Ore. E. B. Hixson, heretofore Traveling Freight Agent,

has been appointed Assistant General Eastern Freight Agent, with headquarters at New York City.

**Chicago, Rock Island & Pacific.**—W. G. Purdy has been elected First Vice-President, Treasurer and Secretary and W. H. Truesdale Second Vice-President and General Manager, both with office at Chicago, Ill. The office of Third Vice-President has been abolished. R. P. Flower has been elected a member of the Executive Committee.

**Chilkoot Railroad & Transport Co.**—The officers of this company, referred to under "Alaska Railroads" in another column, are as follows: President, Hugh C. Wallace; Vice-President, W. G. Pearce; Treasurer, A. T. Pritchard; Acting Secretary, George M. Arkley; Chief Engineer, A. McL. Hawks. The central office is Tacoma, Wash.

**Cincinnati, Hamilton & Dayton.**—J. R. McGregor, heretofore Traveling Passenger Agent at Cincinnati, O., has been transferred to Atlanta, Ga.

**Deckerville, Osceola & Northern.**—The officers of this company, noted in another column, are as follows: President, George W. Decker, Newport, Ark.; Vice-President, E. M. Ford, Deckerville; Secretary and Treasurer, J. G. Webb, Deckerville.

**Denver & Rio Grande.**—Frank W. Swan has been appointed Contracting Freight Agent, with headquarters at St. Louis, Mo.

**Evansville & Richmond.**—The officers of this reorganized company are as follows: President, J. R. Walsh, Chicago; Secretary and Treasurer, L. A. Walton, Chicago; Auditor, F. B. Ogden, Chicago; Chief Engineer, George Crocker, Bedford, Ind.; General Superintendent, J. W. Thompson, Bedford, Ind.; General Freight and Passenger Agent, H. H. Roseman, Bedford, Ind.; General Eastern Agent, E. F. Giberson, 1 Madison avenue, New York City.

**Flint & Pere Marquette.**—The office of H. W. Jameson, Traveling Passenger Agent, has been removed from Saginaw, Mich., to Toledo, O., and that of W. C. Tousey, Traveling Passenger Agent, from Saginaw to Detroit, Mich.

**Fremont, Elkhorn & Missouri Valley.**—B. T. White, heretofore Assistant General Attorney, has been appointed General Attorney, with headquarters at Omaha, Neb., to succeed W. B. Sterling, deceased.

**Leavenworth, Kansas & Western.**—Officers of this company, formerly the Kansas Central, have been elected as follows: Acting General Manager, J. O. Brinkerhoff, with office at Kansas City, Mo.; General Freight and Passenger Agent, W. S. Basinger, with office at Leavenworth, Kan.

**Litchfield, Carrollton & Western.**—C. B. McCall, General Manager, with headquarters at Carlinville, Ill., having resigned, that office has been abolished. T. W. Geer, formerly Trainmaster, has been appointed General Superintendent, with headquarters at Carlinville.

**Louisville & Nashville.**—George Becker has been appointed Auditor of Receipts, to succeed William J. Dickinson, resigned. P. O. Stewart has been appointed Assistant Auditor of Receipts, to succeed Mr. Becker. The above appointment took effect Oct. 21.

**Mexican Central.**—H. J. Snyder has been appointed Southern Agent, with headquarters at New Orleans, La., to succeed J. F. Donohue, resigned.

**Michigan Central.**—W. C. Rowley, heretofore Commercial Agent, with headquarters at Detroit, Mich., has been appointed Assistant General Freight Agent, with headquarters at Bay City, Mich., to succeed E. E. Gerkins, deceased. C. C. Griggs has been appointed Commercial Agent at Detroit, to succeed Mr. Rowley.

**Mobile & Ohio.**—F. E. Guedry has been appointed District Passenger Agent, with office at 211 St. Charles St., New Orleans, La.

**Morristown & Cumberland Gap.**—Frank P. Tate, Auditor and Treasurer, having resigned on account of ill-health, those offices have been abolished, and hereafter all checks will be made payable to and drafts drawn by and in favor of the Receiver. Other duties pertaining to the Auditor's office will be performed by R. T. Baker, General Superintendent.

**Newburg, Dutchess & Connecticut.**—At the annual meeting of stockholders, held at Matteawan, N. Y., Oct. 28, the following new Directors were elected: Clarence Cary, William C. Legendre, both of 59 Wall street, New York.

**New York, Chicago & St. Louis.**—Joseph Bowes has been appointed Traveling Passenger Agent, with headquarters at Kansas City, Mo., to succeed H. H. Moies. Jay W. Adams has been appointed Pacific Coast Passenger Agent, with headquarters at San Francisco, Cal., to succeed William Marcy. W. K. Richards has been appointed Commercial Agent, with headquarters at Pittsburgh, Pa.

**Niagara Falls & Lewiston.**—D. B. Worthington, General Passenger Agent, with headquarters at Buffalo, N. Y., having resigned, the duties of that office will be performed by the President and General Manager. E. I. Brinker has been appointed Traveling Passenger Agent, with headquarters at Buffalo.

**Philadelphia & Reading.**—On Nov. 4 the Pine Grove Division was merged with the Reading Division, and all employees will hereafter report to Supt. A. M. Wilson, of that division, at Reading, Pa.

**St. Louis, Chicago & St. Paul.**—William M. Bushnell, General Freight Agent of the Chicago, Peoria & St. Louis, has in addition been appointed General Freight Agent of this company. C. W. Callegan, heretofore General Freight Agent of this company, has been appointed Assistant General Freight Agent, and also Assistant General Freight Agent of the Chicago, Peoria & St. Louis, with headquarters at Springfield, Ill.

**Salt Lake & Ogden.**—At the annual meeting of stockholders, held Oct. 30, E. B. Critchlow was elected a director, to succeed Causton Browne, Jr.

**South Carolina & Georgia.**—S. C. Black has been appointed Traveling Freight Agent, with headquarters at Charleston, S. C., to succeed W. A. Boyle.

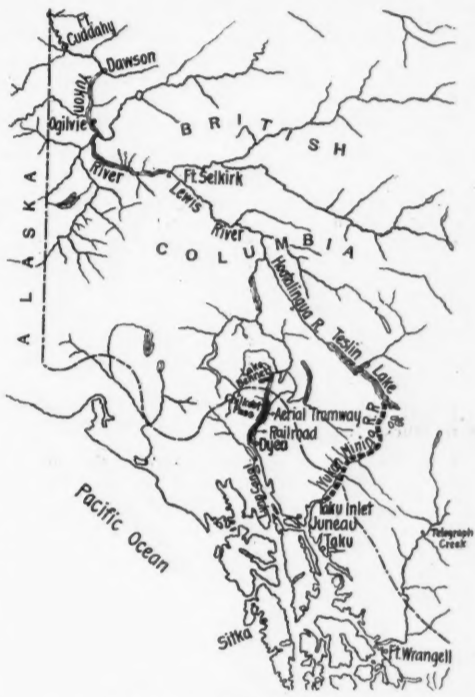
**Southern.**—The office of J. A. Dodson, Superintendent of Trackage, Bridges and Buildings, has been transferred from Washington, D. C., to Greensboro, N. C. J. N. Harrison has been appointed Passenger and Ticket Agent, with headquarters at Rome, Ga., to succeed T. C. Smith.

**Troy Union.**—At the annual meeting of stockholders, held at Troy, N. Y., Nov. 4, the following new directors were elected: Edmund D. Codman, C. L. Mayne, John Cartensen, F. H. Manss, T. N. Smith and J. R. Leonard.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Alaska Railroads.**—Though a number of railroads have been projected into the Klondike only one is under actual construction, that by the Chilkoot Railroad Transport Co., in connection with the Washington & Alaska Steamship Co., whose headquarters are at Tacoma, Wash. (See this column for Oct. 15.) The road is to be about 15 miles long, extending from Dyea at the head of Lynn Canal, north in almost a straight line through Dyea Cañon and over Chilkoot Pass to Crater Lake, where water connection will be made through a series of connected lakes to Lake Bennett and thence down Lewis River and the Yukon to the goldfields. (See the accompanying map.) The first eight miles of the railroad to the mouth of Dyea Cañon will be of ordinary construction, the second portion over the pass will be an aerial cable tramway, Bleichart system. This tramway is being built by the Ironton Iron Co., Ironton, N. J., and is to be completed Jan. 15. Sixty men are building the railroad proper, which is expected to be ready for use Nov. 15. No bonds have been issued for the work, and the money is in hand for its completion. The capacity of the road is estimated at 200 passengers and 120 tons of freight per day. The officers are given in another column.

Surveys have recently been completed for another Alaska railroad to be built by the Yukon Mining, Trading & Transportation Co. (See this column for Aug. 6.) Prof. William A. Pratt, of Delaware State College, Wilmington, who was sent to Alaska by the company to make a survey for the proposed railroad, has returned to the officers of the company at Wilmington with so encouraging a report that work on the line is expected to begin before Jan. 1 next. The line will be about 165 miles long, extending from Taku Inlet, about 20 miles south of Juneau, and then following the river through the mountains, eventually reaching Lake Teslin, the headwaters of navigation on the Yukon River. (See the



Two Proposed Alaska Railroads.

accompanying map.) From that point steamboats can run to every place on the river about four months during the year. The railroad, it is believed, can be operated the entire year, as the snowfall along its route is said not to be over 4 ft. Another point in favor of the Taku route is that the grades will be only three percent, which is considerable less than the majority of Rocky Mountain roads. Professor Pratt, who made the survey, is a practical railroad engineer, having been connected with the Baltimore & Ohio, the Chesapeake & Ohio and other lines, and in this way gained experience in building and operating mountain railroads. In his survey he was assisted by T. Gordon Janney, formerly of the Baltimore & Ohio and an experienced engineer, and P. I. Packard, an officer of the company, who had been over the proposed route before. The party left Seattle, State of Washington, early in August, and was absent nearly two months, during which time they tramped from Taku Inlet to Lake Teslin, making surveys and maps.

Articles of incorporation have been filed in the office of the County Clerk at Portland, Or., of the Skaguay & Lake Bennett Tramway Co., with a capital of \$250,000 to build a line from Skaguay, on the Lynn Canal, over the White Pass, to connect with a water route to the Yukon. The incorporators are Henry E. Batti, Ensley A. Webster, Henry C. Ash and George H. Deernham.

**Atchison, Topeka & Santa Fe.**—The section between Chelburne and Ft. Worth, Tex., 22 miles, on the Gulf, Colorado & Santa Fe Division, is being regraded. The present maximum grade is 1.3 ft. in each direction and the work in progress will change the maximum southbound grade to .9 ft. The general contractors are Ricker Lee & Co., of Galveston, Tex., who have employed on the work three steam shovels, two trains, about 75 teams and 100 men.

**Atlantic Coast Line.**—It is reported that grading has been completed on the South Eastern, which is the connecting link between the Wilmington & Weldon and the Wilmington & Newbern, the three roads forming a part of the Atlantic Coast Line system. The link skirts the city of Wilmington, N. C., and is 2.7 miles long. It is stated that work has been begun on the extension of the Wilmington & Conway Branch from Elrod, N. C. southeast about 11 miles to Ashpole. (See this column for Sept. 3 and Oct. 18.)

**Bellaire, Zanesville & Cincinnati.**—This company expects during the next few weeks to relay about 14 miles of track with new rails. J. K. Geddes, Zanesville, O., is Receiver and General Manager.

**Black Diamond.**—The Ohio River, Tidewater Cynthia, a division of the Black Diamond System, has been incorporated in Kentucky with a capital of \$25,000 to run from Ghent, Ky., southeast through the

counties of Carroll, Gallatin, Grant, Owen, Scott, Harrison, Nicholas, Bourbon, Montgomery and Estill to Irvine, about 100 miles. Albert E. Boone, of Dover, Ky., is the chief promoter.

The Indianapolis, Veray & Tidewater has been organized with capital stock of \$175,000 to build another section of the Black Diamond System. The directors are A. E. Boone, William Kirkby, F. M. Griffith, B. L. Simmons, C. S. Landy, James M. Scott, G. S. Pleasants, A. G. Craig, G. W. Vannelt, C. V. Thiebaud, Samuel Stacy, L. E. Smith and W. L. Fisk.

**Chesapeake Beach.**—According to report work has been begun on this line to extend from Washington east about 30 miles to Chesapeake Beach. There is a force of men at Seat Pleasant, Md., under Contractor H. D. Burrows, and another at Marlborough under H. H. Green, both of the firm of Green & Burrows, Washington. It is expected that grading will be completed by Jan. 1 from the District of Columbia line to Marlborough. Another force of men, it is stated, is at work at the terminus on Chesapeake Beach, where a pier 2,000 ft. long is being put into the bay. L. H. Hyer, Washington, D. C., is Chief Engineer of the Chesapeake Bay Construction Co., which has the general contract for building the road.

**Chicago, Indiana & Eastern.**—It is reported that work has been resumed on the extension of this road from Fairmount, Ind., a point on the Cleveland, Cincinnati, Chicago & St. Louis, northwest 17 miles to Converse. The road as originally projected is to run from Converse southeast 79 miles to Richmond. Ten miles from Fairmount to Matthews was completed and the grading was done for 15 more miles into Muncie some time ago. It is expected that the extension to Muncie will be completed in the near future. H. E. Drew, of Fairmount, Ind., is General Manager.

**Deckerville, Osceola & Northern.**—This company, whose incorporation was noted in this column Oct. 8, is to build a line from Deckerville, in Poinsett County, Ark., northeast 33 miles to Osceola, in Mississippi County, and plans eventually to build through to Paw Paw Junction, Mo., a point on the St. Louis Southwestern. Twelve miles of this road from Deckerville are now in use. The extension will require no bridges, no grades and very little trestling. The officers are given in another column.

**Detroit & Mackinac.**—It is reported that six miles of rails have been laid from La Roche, Mich., on the extension from that city, 20 miles northeast to Onaway. (See this column for Sept. 19.) The course has been cleared to within a mile of Onaway and grading is being carried forward as rapidly as possible under the contractor, J. M. Griffin, of Detroit.

**Detroit, Grand Rapids & Western.**—According to report this road is to build an extension from Grand Rapids northwest to Muskegon, Mich. It is proposed that the route will be over the Detroit, Grand Haven & Milwaukee from Grand Rapids to Nunica, thence over the abandoned roadbed of the Chicago & Michigan to Fruitport, thence to Pickands over the Chicago & West Michigan and from there a new line to Muskegon, in all a route of 38 miles.

**Duluth, Missabe & Northern.**—The extension of 2.5 miles from Hibbing, Minn., to the Pillsbury Mine is reported to have been completed.

**Energizer Momentum Engine Heat, Light & Power Co.**—This company has been incorporated in West Virginia with a capital stock of \$1,000,000, to build a railroad from Charleston, a point on the Chesapeake & Ohio, northeast up the valley of the Elk River, about 60 miles to Sutton, W. Va., a point on the West Virginia & Pittsburgh. The incorporators are: George E. Coolidge, Bristol, Pa.; Charles W. Van Vleck, Joseph Duncan Steinmetz and William B. Coolidge, of Philadelphia.

**Erie.**—This company has completed the work of revising curves and otherwise improving the alignment of its road between Sharpville and Sharon, Pa. (See this column for Aug. 13.) The work was not very expensive, being done gradually through the summer, and it is preparatory to double tracking that portion of the road and increasing the yard facilities. The work of straightening the road between Hubbard and Sharon has been postponed for the present.

**Evansville & Richmond.**—This company has decided to reconstruct that portion of its line between Bedford, Ind., and Westport. No contracts are to be let and it is expected that the work will be completed by Jan. 1. On Dec. 1 the name of the company is to be changed to the Southern Indiana Railway Co. It extends from Elmore, Ind., east 101 1/4 miles to Westport. The names of the new officers under the reconstruction will be found in another column.

**Irontale, Bancroft & Ottawa.**—The extension of five miles on this road (see this column for Oct. 8) is now being built. It is to extend from Baptiste, Ont., east through Bancroft to Herman. About 150 men are at work and the grading is about one-half completed. The maximum grade will be 60 ft. to the mile, and the maximum curve 6 deg. There will be one bridge 300 ft. in length. The road now runs from the Grand Trunk Railway Junction east 45 miles to Baptiste, and is projected to extend to Brockville on the St. Lawrence. Charles J. Pusey, of Irontale, Ont., is President and General Manager.

**Lake Erie & Western.**—This company has re-ballasted 100 miles of track this year, 98 miles of which are in Illinois. (See this column for July 30.) The material used was gravel from pits west of the Wabash River at Lafayette, Ind. Up to the end of the month about 4,000 ft. of trestle had been filled. Nine miles of new 75-lb. rails were laid last month and a like amount will be put down this month. The company has placed five steel girder bridges with stone abutments, four stone arches, 14 iron pipes with stone parapets and is now placing masonry at the ends of 75 iron pipes previously placed.

**Lehigh Valley.**—The village of Seneca Falls, N. Y., has granted a franchise to this road for its extension from Geneva Junction northeast about eight miles to that village (see this column for Oct. 20), and work will be resumed at once. Plans are being considered for a further extension to Auburn.

**Long Island.**—Work was begun three weeks ago on the extension from the North Shore terminus at Great Neck, L. I., northeast 4 1/2 miles to Port Washington. There is to be a heavy cut made at the Port Washington end and a viaduct built across Cohasset Creek. Holmes & Covert have the contract for grading, and the road is to be completed early in the spring.

**Mansfield Short Line.**—This company, whose incorporation was noted in these columns last week, has given a mortgage for \$500,000 to issue bonds to build its road from Lucas, O., through Mansfield to Shelby, about 30 miles.

**Mexican Central.**—It is reported that work has been begun on the extension from Jimenez, Mex., southwest about 60 miles to Parral and that about 350 men are now at work.

**Munising.**—The extension from Mitchell, Mich., west 11.5 to Little Lake, a point on the Chicago & Northwestern, has been completed, and will be opened for traffic Nov. 15. This completes the road from Munising on Lake Superior west through Munising Junction on the Duluth, South Shore & Atlantic to Little Lake, 37 miles. E. H. Scott, La Porte, Ind., is General Manager, and R. C. Young, Munising, Mich., Chief Engineer.

**Northern Pacific.**—It is reported that A. B. Cook, of Helena, Mont., has been awarded the contract for grading the Gaylord & Ruby Valley Branch, which is to be an extension of the Northern Pacific from Gaylord, Mont., south about 25 miles to Twin Bridges. It is stated that part of the grading was done several years ago and that work will begin on the new grading at once. (See this column for April 9.)

**Ohio River & Lake Erie.**—This company was incorporated in Ohio Nov. 5 with a capital stock of \$500,000, to extend its road from Alliance, in Stark County, North to Lake Erie, and from Bergholtz, in Jefferson County, south to the Ohio River. The present road runs from Bergholtz northwest 36 miles, to Alliance, and has been known as the Lake Erie, Alliance & Southern. The incorporators, most of whom are officials of the old company, are: Giles E. Taintor, H. D. Emerson, E. E. Scranton, J. S. Williams and E. J. Miller. The general office is at Alliance. At a meeting of the stockholders, held at Alliance Nov. 8, a Board of Directors was chosen and the following officers appointed: President, G. E. Taintor; Vice-President and Superintendent, H. D. Emerson; Secretary, G. V. L. Hailer.

**Ohio Valley & Junction.**—This company was incorporated in Ohio Nov. 3, with a capital of \$100,000, to build a line in Tuscarawas County from Beach City south about 12 miles through Stroudsburg to Dover. The incorporators were Thomas Kemp, J. F. Townshends, B. W. Robinson, H. B. Marton and Henry Robinson.

**Pennsylvania.**—The second track on the Northern Central Division, between New Cumberland and Marsh Run, Pa., about two miles, was put in service Nov. 7. It is expected that the new track between Marsh Run and Goldsboro will be completed by Dec. 1. This will complete the double track from Bridgeport, opposite Harrisburg, to Baltimore.

**Rio Grande, Sierra Madre & Pacific.**—It is reported that a survey is being made for the proposed extension of this road from Casas Grandes southwest about 300 miles through the Carretas Pass and the valley of the Bavispe River in the state of Sonora, Mex., to a point on the Pacific. The road from Ciudad Juarez, Mex., opposite El Paso, Tex., southwest 157 miles to Casas Grandes was completed this year. (See this column for July 2.) J. P. Ramsey, El Paso, Tex., is General Manager.

**Rio Grande Western.**—Deal Brothers & Mendenhall, of Springfield, Utah, are reported to have obtained a contract for seven miles of grade at Soldiers' Summit, Utah, where changes are to be made on the main line.

**St. Louis & San Francisco.**—This company has just concluded an agreement with the Kansas City, Osceola & Southern, whose line now extends from Kansas City southeast to Osceola, Mo., 112 miles, whereby the latter company will extend its line from Osceola southeast 40 miles to Bolivar to connect there with the St. Louis & San Francisco, thus giving the latter a through line from Kansas City to the Gulf. The arrangement provides that the St. Louis & San Francisco is to operate the entire line for a period of 25 years, but the company has a five-year option to purchase the Kansas City, Osceola & Southern. The extension will be built by the Kansas City, Osceola & Southern under the direct supervision of the engineers of the St. Louis & San Francisco. Work is to begin at once, and the line is expected to be completed within six months. The Kansas City, Osceola & Southern also agrees to put its present line in first-class condition.

**St. Louis Southwestern.**—At a special meeting of the stockholders, held at St. Louis Nov. 4, it was decided to guarantee the payment of the principal and interest of the bonds of the Gray's Point Terminal Railway Co., to the extent of \$15,000 for each line of its proposed road, which is to extend from Delta east 15 miles to Gray's Point, Mo., and will become a part of the St. Louis Southwestern.

**Sioux City, Chicago & Baltimore.**—This company has been incorporated in Iowa and Missouri to build an air line road from Sioux City, Ia., southeast 512 miles to St. Louis. Engineers, under L. F. Wakefield, of Sioux City, are surveying the route south of Shelbyville, Mo. As more than \$12,000,000 of bonds must be floated to insure the building of the road it is probable that some time will elapse before actual construction begins. Shull & Farnsworth, of Sioux City, are counsel for the company.

**Southeastern & Atlantic.**—The building of this belt line around the south side of Norfolk, from Berkeley to Portsmouth, Va., was begun about two weeks ago. It is to be six miles in length, maximum grade 20 ft. per mile, maximum curves 4 deg. There is to be one steel bridge 800 ft. in length with trestle approaches. The contract for bridges has been let to the Pencoyd Bridge Co., Philadelphia, Pa. Grading and track work will be done by the company. A. J. Cassatt, 26 South Fifteenth street, Philadelphia, is President, and Joseph U. Crawford, Broad Street Station, Philadelphia, Chief Engineer.

**Southern.**—It is reported that work has been begun on the extension of the North Carolina Midland Division for Mocksville, N. C., northwest about 35 miles to Mooresville on the Charlotte & Taylorsville Division. J. B. Jones, of Baltimore, is said to have the contract for building.

**Stoke Pogis.**—This company was incorporated in Pennsylvania Nov. 8 with a capital stock of \$50,000 to build a road in Montgomery County, Pa., from Rosemont north 3 1/2 miles to Conshohocken. The directors are: Frederick Phillips, Montgomery Co., Pa., President; Clinton Gage, Jay M. Whitman, William M. Kerr, George C. Schoff, Henry C. Landis and J. N. Trainer, all of Philadelphia.

**Tacoma, Lake Park & Columbia.**—This road, notice of whose sale was given in these columns last week, has been reincorporated as the Tacoma & Columbia River, with offices at 50 Broadway, New York City. The company proposes to extend its line from Lake Park, Wash., southeast nearly 200 miles to The Dalles, Or., where connection will be made with the Oregon Railroad & Navigation Company's lines. William Bailey, of New York, is President.

**Terminal Railroad Association of St. Louis.**—This company has applied to the Municipal Assembly of St. Louis for permission to complete its belt line around the city. The company was formed by the consolidation of the Union Railway & Transit Co., and the Terminal Railway of St. Louis, and is composed of and controlled by the Cleveland, Cincinnati, Chicago & St. Louis, the Louisville & Nashville, the Missouri Pacific, the Wabash, Baltimore & Ohio Southwestern and the St. Louis, Iron Mountain & Southern. It is proposed to carry the tracks across Broadway, where work was stopped about three years ago, to the western limits of the city.

**Texas State.**—Superintendent James P. Gibson, of the Rush Penitentiary, has put convicts at work to grade an extension of this road westward to reach a new supply of timber. The present road extends from Rush west eight miles, and it is expected that it will be eventually extended to Palestine.

**Toledo & Ohio Central.**—It is reported that 1,000 tons of new 70-lb. rails are to be delivered soon for relaying on the eastern and western divisions of this road and that men are now at work putting in five miles of new rails between Halton and Fostoria, O.

**Wiscasset & Quebec.**—It is stated that three miles of track above Albion, Me., have been laid on the extension north about 15 miles to Burnham and that a sub-contract has been let for grading from Burnham to Pittsfield. The present road extends from Albion south 40 miles to Wiscasset, a point on the Maine Central. W. F. P. Fogg, Wiscasset, Me., is General Manager.

**Wyoming & Pond Creek.**—This company was incorporated in Pennsylvania Nov. 9, with a capital of \$60,000, to build a line in Luzerne County, from Sandy Run Junction northeast to Whitehaven, both points on the Lehigh Valley. The directors are A. J. Lathrop, Pittston, Pa.; President; D. O. McCollum, Wilkes-Barre, Pa.; A. M. Treas, Wilkes-Barre; C. L. Hoover, Sandy Run, Pa.; L. L. Rogers, M. G. Lathrop and L. C. Bacon, New York.

**Wyoming Western.**—This company has been incorporated in Wyoming with a capital of \$10,000,000 to build a road across the state through the counties of Converse, Natrona, Fremont and Uinta. It is stated that surveys have been made up the North Platte and Sweetwater Rivers through South Pass, thence southwest down Twin Creek to the state line. The incorporators are: J. A. Van Orsdel, Charles Swansen and J. G. Scott, Officers; President, J. A. Van Orsdel; Vice-President, C. K. Bannister; Secretary and Treasurer, J. L. Hill. The principal office is at Cheyenne.

#### Electric Railroad Construction.

**Allentown, Pa.**—The railroad committee appointed to report on the franchise of the Allentown & Reading Railway Co. declares the franchise void and the company has been notified to remove the tracks within 30 days.

**Ambler, Pa.**—The committee appointed to secure right of way for an electric road report that they have obtained the consent of all but four of the abutting property owners. Many desire to have the line run from Ambler to Norristown by the way of Center Square.

**Berlin, Wis.**—Mr. John Martin, a director of the Oshkosh, Berlin & Omro Railroad Co., writes us that contracts will soon be let for the 22 mile line in four or six weeks. Bonds to the amount of \$250,000 will be placed on the market.

**Butte, Mont.**—The Great Railway Co. has been granted a franchise to build a line from Butte to Walkerville, a distance of about five miles.

**Chambly, Que.**—A press report states that the route of the electric road between Chambly and Longueuil has been decided upon and that there now remains only the distance between St. Johns and St. Valentine to be determined upon. Mr. A. J. Corriveau, of Montreal, is President of the Southwestern Counties Railway, which is building the line.

**Charleston, W. Va.**—Capt. John W. Littlepage, representing a company of local investors, organized as the Capital City Electric Railway Company, which recently purchased the property of the Charleston Horse Railway Co. at Receiver's sale, has made the final payments to the Circuit Court and secured the full title to the property and franchises. Work was begun three days prior to that date by the new owners, who will put in an entire new track, introduce electric power and extend the line about three miles. They hope to have cars running over the entire line by Jan. 1.

**Cincinnati, O.**—The Walnut Hills and Vine street cable lines of the Cincinnati Street Railway Co. are being changed from cable to electricity.

**Conshohocken, Pa.**—The Stoke-Pogis Railway Co., capital \$50,000, was chartered at Harrisburg, Nov. 8, to build an electric line from Rosemont to West Conshohocken, a distance of 3 1/2 miles. The directors are Frederick Phillips, President; Clinton Gage, J. M. Whitman, Wm. M. Kerr, Geo. C. Schoff, Henry C. Landis and J. N. Kerr, all of Philadelphia.

**Detroit, Mich.**—Articles of incorporation of the Detroit, Ann Arbor & Ypsilanti Electric Railway were filed at Lansing Nov. 3. The capital stock of the company is \$400,000, and among the incorporators are James D. Hawks, President; S. F. Angus, John C. Liggett, Obadiah Bingham and M. J. Griffin, of Detroit. It is intended to build from the present terminus of the Detroit Electric Railroad on Michigan avenue, in Spring wells, to the city line of Ypsilanti, connecting there with the Ypsilanti & Ann Arbor line, and, possibly, eventually consolidating with it. The incorporators of the new company are said to have succeeded in purchasing the Albert Pack interest in the Detroit and Saline Plank Road Co. They have also arranged to take over and consolidate with the new construction the existing street railroads between Ann Arbor and Ypsilanti. This would give the new company, when the proposed road is completed, 43 miles of track. If no unlooked-for delays occur the road to Dearborn will be in operation in three weeks. The contract for the section to be built immediately has been let to Contractor M. J. Griffin, and work will be pushed as far as St. Joseph's retreat immediately and as far as Wayne by Christmas.

**Ford City, Pa.**—Initial steps have been taken for building an electric road from Nealon to Ford City.

**Franklin, N. Y.**—The Delaware Terminal Railway Company was incorporated with the Secretary of State on Nov. 9, with a capital stock of \$150,000. The company proposes to operate an electric railroad from the village of Sidney to the village of Franklin, in Delaware

County, a distance of 14½ miles. The directors are Charles L. Burgees, Sigmund T. Meyer, David S. Meyer, John Nef and H. S. Meyer, of New York City; Louis F. Raymond, of Franklin; and Edmund R. Halsey, of Newark, N. J.

**Gettysburg, Pa.**—A charter was granted at the State Department Nov. 8 to the Washington, Westminster & Gettysburg Electric Railway Co., which will build a line 14 miles long, from Gettysburg to the state line. The capital stock is \$400,000, and the officers of the company that proposes to build the portion in Pennsylvania are: President, James B. Colgrove, Washington; directors, Samuel M. Bushman, Charles A. Trostel and Henry C. Little, Gettysburg; Henry A. Gady, Washington; Charles H. Duttera and John A. Shorb, Littlestown.

**Kansas City, Mo.**—The Kansas City-Leavenworth Electric Railway, Power & Mining Co. has been granted a charter with a capital stock of \$6,000,000, for the purpose of building a road from Kansas City to Atkinson through Leavenworth, and also to build a telegraph line and to sell power in the vicinity. It also proposes to do a general coal mining business. The directors are: David A. McKibben, J. M. Laing, H. D. Rush, J. L. McKibben and G. W. Kierstead, of Leavenworth; S. G. McWade and John C. Willard, of Cleveland.

**Maplewood, N. J.**—The South Orange & Maplewood Traction Co. has been incorporated by H. A. Page, South Orange; E. D. Page, New York, and Frank Brewer, West Orange, to build an electric road between the places mentioned in the title. The capital stock is placed at \$100,000, \$25,000 of which is said to have been paid in.

**Milford, Mass.**—The Milford & Woonsocket Street Railway Co. has been formed to build a road from Milford to Blackstone through East Mendon, Mendon Center and South Milford. Among the stockholders are: G. M. Billings, Milford; W. S. Reed, Leominster, and M. S. Myrick, Boston.

**Milton, Mass.**—The Milton, Randolph & Boston Railway Co., and the Quincy & Boston Railway Co., have filed petitions for franchises to build electric roads in Milton.

**Minersville, Pa.**—The Town Council has rescinded the resolutions to annul the franchise of the Schuylkill Electric Railway Co. for failing to build the Heckscher-ville Branch in the time agreed upon when the franchise was granted.

**Needham, Mass.**—The Selectmen of Needham have granted a franchise to the Matick & Cochituate Street Railway Co. for an electric railroad through Needham, from the Wellesley Line to the Dedham line.

**New York.**—A number of employees of the Brooklyn Heights Railroad, of Brooklyn, have been put at work preparing the New York terminus of the Brooklyn Bridge for the electric cars which will run from Brooklyn. The larger part of the tracks to the bridge approaches have been laid, and, unless unexpectedly hindered, the entire work will be completed by the middle of December. It is probable, however, that the cars will not be placed in operation until the last of next month.

Twelve of the new cars of the Metropolitan Street Railway have been placed in service on the new electric conduit road between Astor place and Forty-second street on Madison avenue.

**Omaha, Neb.**—The Manawa Electric Railroad has filed its petition and a special election to vote on the charter for an extension of the company's tracks will be held Nov. 20. It is proposed to expend about \$300,000. The first part of the line will be built from the Manawa line to the new bridge recently built. It will be a double-track road and 60-lb. T-rails will be laid nearly the entire distance.

**Oswego, N. Y.**—Permission has been granted to the Oswego Street Railroad Co. to cross the tracks of the New York, Ontario & Western at grade. The granting of this right of way means the extension of the line to a point near the entrance of the St. Paul cemetery. The company is now laying ties in the building of its extension to Minneto.

**Parkersburg, W. Va.**—The Parkersburg & Marietta Traction Co. was incorporated last week with a capital stock of \$5,000,000 to build and operate an electric road between Parkersburg, W. Va., and Marietta, O., a distance of 14 miles, by way of Williamstown, W. Va., and several other small towns. The incorporators are: A. McCash and E. E. Wickson, of Parkersburg, W. Va.; A. J. Yoke, of Grafton, W. Va.; S. S. Stone, of Vienna, W. Va., and W. W. Reynolds, of Oil City, Pa. The Traction Company will use the Marietta & Williamstown bridge over the Ohio River, and will include in its holdings the Park City Railway, of Parkersburg, and the Marietta Street Railway, of Marietta.

**Philadelphia, Pa.**—A committee appointed to report on the ordinance granting permission to the Southwestern Passenger Railway Co. to build an electric road in the southwestern section of the city will make a report very soon. The same committee recommends the ordinance to extend the franchise of the Elmwood & Fairmount Park Passenger Railway Co. until April 1, 1898.

**Rochester, Ind.**—Promoters of the Michigan, Indiana & St. Louis Electric Railway, which is to be built from Goshen to Danville, Ill., held a meeting in Rochester on Nov. 3. A dozen towns were represented, and it is proposed to run either by Bourbon, Rochester and Logansport or Plymouth, Culver and Winamac. Committees were appointed and the next meeting will be held at Winamac, Nov. 17, to determine upon the route.

**St. Louis, Mo.**—The Willmore bill authorizing the Forest Park Scenic Railway Co., to build an electric road in Forest Park has been submitted to the Council. The period is 50 years, during which time the company agrees to pay the city two per cent. of its gross earnings annually for the first 10 years, three per cent. for the next 20 years and five per cent. for the last 20. Trains are to be run every 10 minutes during the day from April 1 to Nov. 1, and every hour during the balance of the year. The speed is regulated to eight miles an hour.

A bill has also been introduced granting to the St. Louis & Kirkwood Railway Co., known as the Hausman Line, a franchise to extend its tracks so as to enable it to connect with the Suburban Railroad on Maple avenue. The city agrees to pay \$500 a year between the fifth and tenth years and \$1,000 a year for the remaining 30 of its existence.

A bill has also been introduced granting the St. Louis & Merrimac River Railroad a franchise to extend its tracks over a private right of way from Sarah street to O'Fallon Park. After 1910 an annual percentage of the road's gross receipts is to be paid to the city as pro-

vided for in franchises already granted to the company. The Cabene Place Railway Co., of St. Louis, has been incorporated with a capital stock of \$140,000 by Edward Whittaker, C. D. McClure and others.

Construction work has been begun on the St. Louis, Fenton & Southwestern Electric Railway. As previously noted, the road will be built over private right of way from St. Louis southwest to Fenton.

**Salem, N. Y.**—A portion of the Erie & Central New York Railroad has been completed and is now running.

**Sherbrooke, Que.**—The road which has been built in Sherbrooke, Que., will soon be placed in operation.

**South Orange, N. J.**—The new extension of the South Orange & Maplewood Street Railroad Co. to Main street, Orange, was completed and has been formally opened. The cars on this line will be heated by electricity, and will be vestibuled.

**Syracuse, N. Y.**—It is stated that the Moravia, Skaneateles & Syracuse Electric Railroad will commence work very soon.

**Titusville, N. Y.**—The plant of the Titusville Electric Traction Co., which is building an electric road from Hydetown to Titusville and Pleasantville, is designed for 450 H. P., 300 of which is now being installed, and which consists of two 72 in. x 18-ft. horizontal tubular, of the Atlas heavy duty type, and built for 150 lbs. working pressure. Each boiler has 78 4-in. tubes. When completed, two 16 x 42 in. Atlas Corliss engines of improved design will be used, each of which will drive a 100 KW. General Electric generator. But one engine is now being installed. The pumps and heater are of the Stillwell-Bierce & Smith-Vaile type, the heater being of their recently improved horizontal type and the pumps are all of the duplex pattern. The building is now in process of construction, and it is the intention to have the plant completed and in running order by Jan. 1 next.

**Toledo, O.**—An effort is being made to induce the Toledo, Bowling Green & Fremont Railroad to change its route and extend the road from Bowling Green into the oil districts instead of building to Tremont. It is argued that were the road built to the oil districts a paying freight business would be built up.

**Toronto, Ont.**—Our correspondent informs us that the City Council has decided to extend the street railroad to the island.

**Whitehall, N. Y.**—Preliminary surveys have been completed for the Whitehall & Granville Electric Railroad which is to be known as the Whitehall & Granville Electric Railway and will be built for both passenger and freight traffic.

**Yonkers, N. Y.**—The Yonkers Railroad Co. has filed a sufficient number of consents for the building of its line in South Broadway. The Commissioner of Public Works has refused to grant the permit because of a remonstrance presented at the last meeting of the Common Council.

**Youngstown, O.**—The Mahoning Valley Southeastern Electric Railway Co. has been granted a franchise giving authority to build a line through the county to Struthers, six miles from Youngstown. The capital stock will be placed at \$75,000. The road will probably be built very soon and it is hoped to have it completed by March next.

#### GENERAL RAILROAD NEWS.

**Boston & Albany.**—The earnings for the quarter ended Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc. or dec.
Gross earn.	\$2,322,402	\$2,373,947	I. \$51,545
Oper. expen.	1,901,659	1,723,743	I. 177,916
Net earn.	\$620,743	\$650,202	D. \$29,459
Charges	142,675	139,285	I. 3,390
Surplus	\$478,068	\$510,917	D. \$32,849

**Boston & Maine.**—The earnings for the quarter Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc.
Gross earn.	\$5,512,249	\$5,512,249	\$153,642
Oper. expen.	3,747,941	3,716,689	31,252
Net earn.	\$1,917,500	\$1,795,560	\$122,939
Other income	121,712	107,570	14,142
Total net earn.	\$2,039,212	\$1,903,130	\$136,082
Charges	1,349,466	1,292,785	56,681
Surplus	\$690,196	\$610,345	\$79,851

**Boston, Revere Beach & Lynn.**—The annual report for the year ended June 30, 1897, shows earnings as follows:

Year:	1897.	1896.
Gross earn.	\$264,530	\$264,530
Oper. expen.	183,838	183,838
Net earn.	\$80,692	\$80,692
Interest	\$18,671	\$18,671
Taxes	6,277	6,277
Dividends	25,500	25,500
Total	\$80,448	\$80,448

**Bridgton & Saco River.**—The annual report for the year ended June 30, 1897, shows earnings as follows:

Year:	1897.	1896.
Gross earn.	\$28,405	\$28,405
Oper. expen.	19,019	19,019
Net earn.	\$9,386	\$9,386
Fixed charges	6,548	6,548
Surplus	\$2,838	\$2,838
Dividend of two per cent.	1,800	1,800
Balance	\$938	\$938

**Central Vermont.**—The trustees of the estate of J. R. Langdon, of Vermont, have withdrawn \$600,000 of first mortgage bonds from deposit under the reorganization plan, and it is understood that other stockholders will withdraw and steps be taken for a new plan of reorganization whereby the first mortgage bondholders will be better protected than under the present plan. (See this column for Sept. 17.)

**Chicago, Burlington & Quincy.**—At the annual meeting of stockholders, held in Chicago Nov. 3, it was decided to purchase the Grand Island & Wyoming Central, the Grand Island & Northern Wyoming and the Big Horn Southern, all now operated by this company under leases.

**Delaware, Lackawanna & Western.**—The earnings of the leased lines for the quarter ended Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc. or Dec.
Gross earn.	\$2,372,003	\$2,461,715	D. \$89,712
Oper. expen.	1,075,701	1,153,310	D. 82,609
Net earn.	\$1,296,302	\$1,308,405	D. \$12,103
Fixed charges	628,249	620,719	I. 7,530
Surplus	\$668,053	\$687,686	D. \$19,633

**Denver & Rio Grande.**—The earnings for September and for the three months ended Sept. 30 were reported as follows:

September:	1897.	1896.	Inc.
Gross earn.	\$731,313	\$623,025	\$108,288
Oper. expen.	438,941	379,815	\$59,099
Net earn.	\$292,369	\$243,180	\$49,189
Charges	204,561	200,520	4,042
Surplus	\$87,807	\$42,660	\$45,147
Three months:	1897.	1896.	Inc.
Gross earn.	\$2,114,426	\$1,569,919	\$544,507
Oper. expen.	1,230,636	1,115,896	114,740
Net earn.	\$883,790	\$754,023	\$129,767
Charges	589,811	581,949	7,862
Surplus	\$293,979	\$172,074	\$121,905

**Erie.**—The earnings for September and the 10 months ended Sept. 30 were reported as follows:

September:	1897.	1896.	Inc.
Gross earn.	\$1,189,669	\$2,769,490	\$1,579,821
Oper. expen. and taxes	2,370,913	1,935,932	\$434,981
Net earn.	\$888,726	\$832,558	\$56,168
Ten months:	1897.	1896.	Inc.
Gross earn.	\$6,654,406	\$5,388,126	\$1,266,280
Oper. expen. and taxes	20,137,028	18,953,359	1,183,669
Net earn.	\$6,517,378	\$6,454,767	\$62,611

**Fitchburg.**—The earnings for the quarter ended Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc.
Gross earn.	\$1,997,234	\$1,867,587	\$129,647
Oper. expen.	1,254,331	1,193,833	\$60,498
Net earn.	\$742,903	\$673,754	\$69,149
Interest, etc.	382,518	371,618	10,900
Balance	\$390,385	\$300,116	\$90,269

The gross earnings for September, 1897, were \$702,248, against \$632,932 for 1896, a gain of \$69,316.

**Ft. Plain & Richfield Springs.**—This property is advertised for sale at public auction at Herkimer, N. Y., Dec. 9, on judgments for about \$18,000. It is stated that the entire road from Richfield Springs to Ft. Plain, 22 miles, is graded and bridge abutments built, but no rails have been laid.

**Great Northern.**—The approximate gross earnings for October and for the four months ended Oct. 31 were reported as follows:

October:	1897.	1896.	Inc.
P. M. & M. leased lines	\$2,214,196	\$2,059,345	\$154,851
Eastern Ry. of Minn.	282,530	260,490	22,040
Montana Central Ry.	202,581	162,475	40,106
Total for system	\$2,719,317	\$2,482,220	\$237,097
Four months:	1897.	1896.	Inc.
P. M. & M. leased lines	\$7,177,909	\$6,540,596	\$637,313
Eastern Ry. of Minn.	856,196	836,605	19,591
Montana Central Ry.	730,361	656,224	74,137
Total for system	\$8,764,466	\$8,033,425	\$731,041

**Illinois Central.**—The earnings for September and for the three months ended Sept. 30, were reported as follows:

September:	1897.	1896.	Inc.
Gross earn.	\$2,341,201	\$1,995,056	\$346,145
Oper. expen.	1,661,075	1,319,679	\$341,396
Net earn.	\$680,129	\$585,377	\$94,752
Three months:	1897.	1896.	Inc.
Gross earn.	\$6,505,958	\$5,199,541	\$1,306,417
Oper. expen.	4,779,739	3,868,835	\$910,904
Net earn.	\$1,726,219	\$1,330,706	\$395,513

**Long Island.**—The earnings for September and for the three months ended Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc. or Dec.
Gross earn.	\$1,535,381	\$1,433,229	I. \$102,152
Oper. expen.	819,795	763,180	I. 56,615
Net earn.	\$555,586	\$670,049	I. \$114,463
Other income	64,578	51,599	I. 12,979
Total income	\$750,164	\$721,648	I. \$28,516
Charges	307,759	315,021	D. 7,262
Surplus	\$442,405	\$406,627	I. \$35,778

**Milwaukee, Benton Harbor & Columbus.**—The South Haven & Eastern, of which a controlling interest has been recently acquired, has been turned over to this company. (See this column for July 23.) This is a narrow-gauge road running from South Haven, Mich., southeast through Hartford to Lawton, 37 miles, and work is in progress to make it standard gauge.

**Morristown & Cumberland Gap.**—The Tennessee Supreme Court has ordered the sale of this road to satisfy claims, as follows: Back taxes, \$4,000; right of way claims, about \$20,000; receiver certificates, about \$12,000. The road extends from Morristown, Tenn., to Corrytown, 42 miles, and the first sale was ordered to take place Feb. 20.

**New York Central & Hudson River.**—The gross earnings for October, 1897, were \$4,253,118 against \$4,148,078 in 1896, an increase of \$105,040.

**New York, New Haven & Hartford.**—The earnings for the quarter ended Sept. 30 were reported as follows:

Three months:	1897.	1896.	Inc. or Dec.
Gross earn.	\$8,345,150	\$7,892,932	I. \$452,218
Oper. expen.	4,946,224	5,070,511	D. 124,287
Net earn.	\$3,398,926	\$2,822,421	I. \$576,505
Other income	31,192	110,025	D. 78,833
Total	\$3,430,118	\$2,932,446	I. \$497,672
Fixed charges	1,576,290	1,563,674	I. 12,616
Surplus	\$1,853,828	\$1,368,772	I. \$485,056

**Old Colony.**—The Massachusetts Railroad Commissioners have approved the issue of \$200,000 four per cent. bonds to run until 1925 under the issue voted by the directors of this leased line of the New York, New Haven & Hartford, Sept. 28. (See this column for Oct. 1.)

**Oregon Improvement Co.**—The entire property of this company was sold at public auction for \$1,000,000 at Seattle, Wash., Nov. 6, by order of the Circuit Court Master of Chancery Eben Smith. (See this column for

Oct. 15.) The purchasers were John R. Waterbury and T. Jefferson Coolidge, Jr., representing the Reorganization Committee. Depositors of the various securities called for by the Reorganization Committee, of which John I. Waterbury is Chairman, are notified that the third installment of \$25 on each consolidated mortgage bond, \$2.50 on each share of preferred stock, of \$2 on each share of common stock, according to the accepted plan, as detailed in this column Sept. 12, has been called to be paid at the Manhattan Trust Company, New York, and the Old Colony Trust Co., of Boston.

**Oregon Railroad & Navigation.**—The earnings for September and for the three months ended Sept. 30 were reported as follows:

September:	1897.	1895.	Inc.
Gross earn.....	\$702,320	\$451,064	\$251,256
Oper. expen.....	316,286	221,397	94,889
Net earn.....	\$386,034	\$229,667	\$156,367
Three months:			
Gross earn.....	\$1,698,913	\$1,172,707	\$526,206
Oper. expen.....	851,869	710,293	141,576
Net earn.....	\$847,044	\$462,414	\$384,630

**St. Louis & San Francisco.**—Judge Thomas has issued an order at Vinita, I. T., appointing R. L. McClure, of Ft. Smith, Ark., a Special Master to sell the Central Division of the Atlantic & Pacific under foreclosure of the first mortgage for \$2,794,000. This action is said to be in accordance with the plan of the St. Louis & San Francisco to purchase this line free of all incumbrance which it has heretofore operated.

**Union Pacific.**—Judge W. H. Sanborn, of the U. S. Court, at St. Paul, Minn., has confirmed the government foreclosure sale of the main line on Nov. 1. The sale of the Kansas Pacific branch under the government foreclosure has been postponed from Nov. 4 to Dec. 16, at Topeka, Kan., and the sale of the Denver Pacific first mortgage from Nov. 8 to Dec. 20, at Denver.

**Wisconsin Central.**—The Reorganization Committee, of which T. Jefferson Coolidge, of Boston, is Chairman, announces that over 83 per cent. of the improvement bonds have been deposited and that bonds not heretofore deposited will be received up to Nov. 15, after which they will be received only on payment of \$10 penalty per bond. (See this column for Oct. 8.)

#### Electric Railroad News.

**Baltimore, Md.**—The Baltimore-Northern Railway Co., which was recently formed by the consolidation of the Falls Road Electric Railway Co. and the Pikesville, Reisterstown & Emory Grove Railroad Co., has placed a mortgage deed of trust on record to cover the issue of \$1,250,000 50 year 5 per cent. gold bonds. The new company has assumed the indebtedness of the other corporations, amounting to \$1,100,000.

**Bennington, Vt.**—A certificate of consolidation of the Bennington Electric Railroad Co. and the Hoosick Valley Railroad Co. was filed with the Secretary of State on Nov. 9, the new company to be known as the Bennington & Hoosick Valley Railroad Co., and its capital stock is \$160,000. The directors are Galen C. Moses, of Bath, Me.; E. L. Bates and I. E. Gibson, of Bennington, Vt.; W. C. Goer, of Troy, and G. E. Greene, Joseph Buckley, W. M. Holmes, Levi Worden and G. F. Rising, of Hoosick Falls.

**Bloomington, Ill.**—The application for a Receiver for the Bloomington Street Railway Co. will be withdrawn and the same management will remain in control until next May.

**Boston.**—The Massachusetts Railroad Commission has authorized the issue of \$80,000 additional stock by the Quincy & Boston Electric Railway Co., to provide for the floating indebtedness.

**Chicago.**—The North Chicago Electric Railway Co. has sold to N. W. Harris & Co. the first mortgage 6 per cent. bonds, amounting to \$363,000. The sale was made for the purpose of extending and improving the line.

**Hull, Que.**—The Aylmer Branch of the Canadian Pacific Railroad has been purchased by the Hull Electric Railway Co. The line is nine miles in length and connects Aylmer with Ottawa. The Hull company will now endeavor to secure a franchise in Ottawa and compete with the Ottawa Electric Railway Co.

**Jersey City, N. J.**—The act of the last State Legislature requiring traction companies in New Jersey to run vestibuled cars between Nov. 1 and April 1, in order to protect the motormen, went into effect last week. The Consolidated Traction Co., of Jersey City, has not complied with the law, which imposes a penalty of \$50 a day for each car run without a vestibule. A number of the motormen of the company were arrested on Monday of last week, and it is understood that if judgment is made against them the company will test the constitutionality of the law. Mr. Spencer Weart, counsel for the company, states that the law is vague and an interpretation is necessary and says the company is not seeking to evade the law, but that it would like to know what the law really means before a large expenditure is made.

**Long Island City, L. I.**—Mayor Gleason last week ordered the Commissioner of Public Works to revoke the permit of the New York & Queens County Electric Railway Co., which had begun to lay new rails on Borden avenue near the Dutch Kills.

**Marion, O.**—The principal creditors of the Clodfelter Interurban Railway Co. are said to have reached an agreement for the complete reorganization of that company under the name of the Indiana Traction Co. A committee was appointed to report on the most advisable route.

**Pontiac, Mich.**—The City Attorney has asked for an injunction against the company restraining it from running its cars in Pontiac until the provisions of the franchise are fully complied with.

**Pottsville, Pa.**—Mr. Lewis S. Wright has resigned as General Manager of the Schuylkill Electric Railway Co., which took effect Nov. 8. The Superintendent will attend to the duties of the office until a successor to Mr. Wright has been appointed.

**St. Louis, Mo.**—The Delmar Avenue & Clayton Railway Co. has asked the St. Louis County Commissioners to return the \$1,000 guarantee which was deposited before the company began to build its line. Subsequently, it appears that the County Court agreed to abandon part of the route and consequently the road was not completed in the specified time. This, the company claims, annuls the franchises and it now asks for the return of the deposit.

**St. Thomas, Ont.**—Our correspondent informs us that the City Council has decided to submit a by-law to the ratepayers to guarantee the bonds of the street railroad to the amount of \$50,000, providing the motive power of the road is changed to electricity.

**Sing Sing, N. Y.**—Mr. John V. Cockroft has been appointed Receiver of the Ossining Electric Railway Co., the complainant being John B. Truesdell. The Receiver must file bonds to the sum of \$10,000 and is directed to continue the railroad pending further orders from the court. This road is operated entirely within the limits of Sing Sing and has been running for about five years. It is supposed that this is a preliminary step to the reorganization of the company on a plan which will include an extension of the line to other villages in the county.

**Worcester, Mass.**—At the annual meeting of the stockholders of the Worcester & Suburban Railway Co. it was decided to ratify the lease of the Blackstone Valley Street Railway Co. The lease was for three years, with the condition that it may be continued 96 years.

#### TRAFFIC.

##### Traffic Notes.

The Missouri Valley Car Service Association has been organized at St. Joseph, Mo. Its territory will include the cities of St. Joseph, Atchison and Leavenworth.

The Lehigh Valley announces a weekly line of tourist sleeping cars from Philadelphia to California over the Grand Trunk, the Rock Island and the Denver & Rio Grande.

Ladenburg, Thalmann & Co., of New York, have sued the Standard Oil Co., for \$300,000 damages, due to alleged unlawful discrimination in freight rates on oil shipped during the years 1884-87. It is alleged that the Standard Oil Co., shipper of the oil, received rebates from the Pennsylvania Railroad.

The *Cleveland Leader* says that the railroads carrying freight to that city will make a determined effort to keep the electric lines from doing a general freight business. Some of the electric lines already carry cans of milk and various kinds of merchandise, and load and unload cars in the Public Square. An officer of the Pennsylvania, whose office overlooks the square, says that the view from his window frequently resembles that of a freight yard.

The Southern Pacific announces that the Sunset Limited train, which is now running twice a week between Chicago and San Francisco, will hereafter run every other trip to New Orleans instead of Chicago, the quarantine restrictions at New Orleans having been removed.

Southern newspapers now contain announcements every day of the resumption of the passenger traffic where it has been interrupted by quarantine restrictions and the yellow fever scare; and by the time these lines reach the reader most or all of the railroads will, no doubt, be running all their regular passenger trains.

The United States Circuit Court in Texas, in the suit of McFadden against the Texas Railroad Commission and seven railroad companies, has sustained the State Commission in its right to prescribe regulations for compressing cotton. The compress regulations of the Commission were held not to have deprived the plaintiff of his property without due process of law and not to have interfered with interstate commerce. The decision, by Judge Maxey, says that—

"It is not to be presumed that the railroad commission would engage in a deliberate attempt to destroy or cripple commerce carriers, or that it would formulate rules either to harass the citizen or to encourage and foster monopolies, and the party complaining of its action should make out a clear case of wrong or excess of power to justify the court in staying its hand and paralyzing its efforts by the summary process of injunction." The plaintiff has appealed the case to the United States Circuit Court of Appeals.

##### Differential Passenger Fares to and from St. Louis.

A large number of St. Louis business men have written to the managers of the Joint Traffic Association protesting against the carrying out of the recommendation of the managers that excess fare must be charged on fast trains between St. Louis and eastern cities. The standard time agreed upon by the managers is 33 hours between New York and St. Louis and the increase in the rate is \$1 for each hour or fraction of an hour less than the standard. The complainants aver that the fast St. Louis trains are not to be compared with those running between New York and Chicago. They say that "The so-called limited trains are not in the full sense of the word limited or especially fast trains, as it is only over a part of the lines that a high rate of speed is granted. The car of the Pennsylvania line that leaves St. Louis at 1 p. m. is attached, we understand, to the Chicago Limited at Pittsburgh; the train by the Big Four is joined to the Cincinnati train at Gallion, O., and both these trains from St. Louis to their points of connection are but ordinary trains, while the fast trains from Chicago are solid vestibuled Pullman trains, taking no coaches or second-class cars, and are equipped with smoking-car, reading-room, barber shop and bath-rooms, and run as solid trains between Chicago and New York. St. Louis has no such service as this, and yet it is proposed to put our so-called limited trains on a parity with those solid trains from Chicago. Such action would be the means of diverting traffic of Texas and the Southwest from this gateway to Memphis and New Orleans. It would make the connection between Western and Eastern lines so close that travelers journeying through St. Louis would have no time whatever in St. Louis, while passengers through the Chicago gateway have from five to ten hours' lay-over. On the strictly limited trains (such as we do not have) the public who desire such service are willing to pay higher prices than on ordinary trains such as we have out of St. Louis. Chicago, by reason of more lines to the East, has more differential trains below standard rates and more trains where standard rates only are charged, and parties may select any of several trains and pay accordingly."

##### Settlement of the Troy (Ala.) Long and Short Haul Case.

The United States Supreme Court has affirmed the decision of the lower court in the case of the Interstate Commerce Commission against the Alabama Midland and the Central of Georgia Railroad Company and others. The case arose out of charges that the companies were disregarding the long and short haul law. The point at issue was whether, when there was competition between railroad and water transportation, the roads must in making lower rates first get leave from the Interstate Commerce Commission, and it was decided in the negative by the court in an opinion handed down by Justice Shiras.

The action was begun before the Interstate Commerce Commission in 1892 upon a petition from the Board of Trade of Troy, Ala., alleging a discrimination by the roads against that town in the interest of Montgomery and other places. The roads defended their rates as necessary to meet water transportation; but the Commission decided against them, and also held that preference in rates should not be granted except upon authority first secured from the Commission.

The court has now overruled the Commission on both points, holding on the first that "competition is one of the most obvious and effective circumstances that make the conditions under which a long and short haul is performed substantially dissimilar." Justice Shiras said, however, that the decision was not intended to relieve common carriers from the restraints of the third and fourth sections of the law, but that its purport was that these sections are "not so stringent and imperative as to exclude in all cases the matter of competition in determining the questions of undue and unreasonable preference."

Upon the other point, as to whether railroad companies can be relieved from the operations of the long and short haul clause of the Interstate Commerce Act without first invoking the consent of the Commission, Justice Shiras said: "We are unable to suppose that Congress intended to forbid common carriers, in cases where the circumstances and conditions are substantially dissimilar, from making different rates until and unless the Commission shall authorize them to do so." The decision of the Circuit Court of Appeals for the Sixth Circuit was affirmed.

Justice Shiras declares that in view of former rulings of the court, which are cited, the questions whether, in particular instances, there has been an undue or unreasonable prejudice are questions of fact. . . . Coming at last to the questions of fact in this case "we encounter a large amount of conflicting evidence. It seems undeniable, as the effect of the evidence on both sides; that an actual dissimilarity of circumstances and conditions exists between the cities concerned, both as respects the volume of their respective trade and the competition affecting rates occasioned by rival routes by land and water. Indeed, the Commission itself recognized such a state of facts by making an allowance in the rates prescribed for dissimilarity resulting from competition, and it was contended on behalf of the Commission, both in the courts below and in this court, that the competition did not justify the discriminations against Troy to the extent shown, and that the allowance made therefor by the Commission was a due allowance. The issue is thus restricted to the question of the preponderance of the evidence on the respective sides of the controversy. We have read the evidence disclosed by the record and have endeavored to weigh it with the aid of able and elaborate discussions by the respective counsel. No useful purpose would be served by an attempt to formally state and analyze the evidence, but the result is that we are not convinced that the courts below erred in their estimate of the evidence, and that we perceive no error in the principles of law on which they proceeded in the application of the evidence."

Justice Harlan dissented from the opinion, remarking that it went far toward defeating the objects of the Interstate Commerce law, and adding: "It not only minimizes the power of the Interstate Commerce Commission far below the intention of Congress with reference to it, but it puts into the hands of the railroad companies the power to so arrange the transportation business of the country as to destroy the business of intermedial points."

##### Chicago Traffic Matters.

CHICAGO, Nov. 10, 1897.  
The long-drawn-out conference held in this city during the past week between the Colorado lines and the Gulf steamship companies in regard to equalizing rates from New York to Colorado points via gulf ports ended in a total disagreement. The steamship people insisted upon big differentials, to which the railroads refused to agree, and the railroads have decided to take independent action. They will meet the steamship competition by applying from St. Louis and Chicago such rates as, added to the lowest rate from New York, will make the same through rate as is made by the water lines.

Acting on "recommendations" from the managers, the Erie has withdrawn all its cut dairy rates, which for some reason have been kept in for some weeks in spite of all remonstrances.

A readjustment of grain rates to the east across Lake Michigan has been made by the Northwestern and the St. Paul, whereby the inequalities that have existed to the disadvantage of Milwaukee, and in favor of Green Bay and Manitowoc, have been done away with, the adjustment necessitating the reducing of some of the rates in Wisconsin about a cent and the raising of others.

All-rail grain rates from Chicago to the seaboard are said to be badly demoralized, many shippers getting as low as 17½ cents to New York; provisions are cut from 5 to 8 cents. The fertilizer rate to New York has been formally reduced to 16½ cents, the rate covering tankage, dry blood, etc. This places the Chicago shippers in a position to meet the competition of shippers from and through East St. Louis, where contracts exist on the basis of this rate extending until April, 1898.

The Santa Fe has met the 15 cent rate on grain from Kansas City to the gulf ports made by the Kansas City, Pittsburgh & Gulf. This will divert grain from Northern and Eastern markets and the competing lines will be forced to follow. The lake rate from Chicago to Buffalo has fallen to 1 cent a bushel on corn and oats.

Eastbound shipments from Chicago and Chicago junctions to points at and beyond the western termini of the trunk lines for the week ending Nov. 4 amounted to 57,927 tons, as compared with 62,326 tons the preceding week. This statement includes 15,110 tons of grain, 3,669 tons of flour and 14,028 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING Nov. 4.		WEEK ENDING Oct. 28.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	4,314	7.5	3,475	5.6
C., C. & St. Louis.....	4,628	8.0	4,618	7.4
Erie.....	9,106	15.7	9,855	15.8
Grand Trunk.....	4,572	7.9	6,966	11.2
L. S. & M. S.....	4,770	8.2	5,617	9.0
Michigan Central.....	5,112	8.8	4,983	8.0
N. Y., Chi. & St. L.....	6,398	11.1	6,550	10.5
Pitts., Cin., Chi. & St. Louis.	5,760	9.9	5,986	9.6
Pitts., Ft. Wayne & Chicago	8,693	15.0	8,910	14.3
Wabash.....	4,574	7.9	5,356	8.6
Totals.....	57,927	100.0	62,326	100.0

Lake shipments last week were 141,226 tons.